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THE GENERA OF PARASITIC WASPS OF THE
BRACONID SUBFAMILY EUPHORINAE,¹ WITH
A REVIEW OF THE NEARCTIC SPECIESBy C. F. W. MUESEBECK, *principal entomologist, Division of Insect Identification,
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INTRODUCTION

Owing to the lack of a satisfactory classification of the braconid subfamily Euphorinae, the correct identification of forms falling in this group and their proper generic placement have been attended with much difficulty. Requests for such identifications persuaded the writer to undertake a generic revision of the subfamily, especially since he had had the privilege several years ago of studying pertinent material in the collections of certain European institutions. These collections, together with that of the United States National Museum, contain the types of most of the genera involved.

From the standpoint of host associations the group is an especially interesting one, even though no definite information is as yet available concerning the kinds of hosts attacked by any species of several of the genera, including *Streblocera* Westwood, *Wesmaelia* Foerster, *Myiocephalus* Marshall, and *Syntretus* Foerster.

Meteorus Haliday is the largest and best-known genus of the subfamily and contains a number of species that are of appreciable economic importance in the control of certain injurious insects. Most of the species the habits and biology of which have been investigated are internal parasites of lepidopterous larvae, as, for example, *vulgaris* (Cresson) (figs. 1, A; 2, E), a common gregarious parasite of cutworms; *hyphantriae* Riley, an abundant polyphagous

¹ Order Hymenoptera, superfamily Ichneumonoidea.

species; *lorostegi* Viereck, a parasite of the sugar beet webworm and other pyralids; and *versicolor* (Wesmael), imported from Europe to aid in the control of the brown-tail and satin moths. Certain other species of *Meteorus* are parasites of coleopterous larvae. These have been less thoroughly investigated, but this host association has been

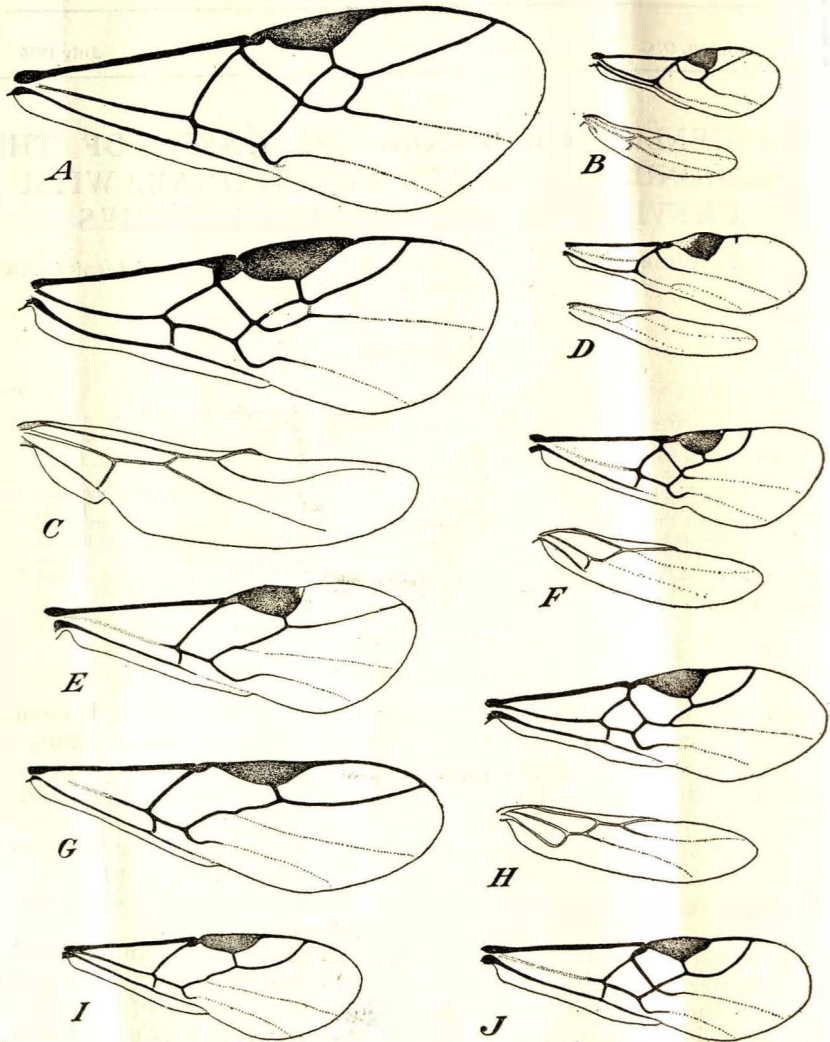


FIGURE 1.—A, Front wing of *Meteorus vulgaris*; B, front and hind wings of *Cryptoxilos convergens*; C, front and hind wings of *Aridetus fisheri*; D, front and hind wings of *Euphoriella incerta*; E, front wing of *Syntretus vigilax*; F, front and hind wings of *Euphorus pallipes*; G, front wing of *Myiocephalus doops*; H, front and hind wings of *Perilitus coccinellae*; I, front wing of *Microctonus carabivorus*; J, front wing of *Wesmaelia pendula*. (Drawn by Eleanor A. Carlin.)

definitely established for some forms. DeLeon (5)², for instance, has recently published some biological notes on *hypophloe*i Cushman, which parasitizes the larvae of the tenebrionid *Hypophloeus parallelus* Melsh.

² Italic numbers in parentheses refer to Literature Cited, p. 36.

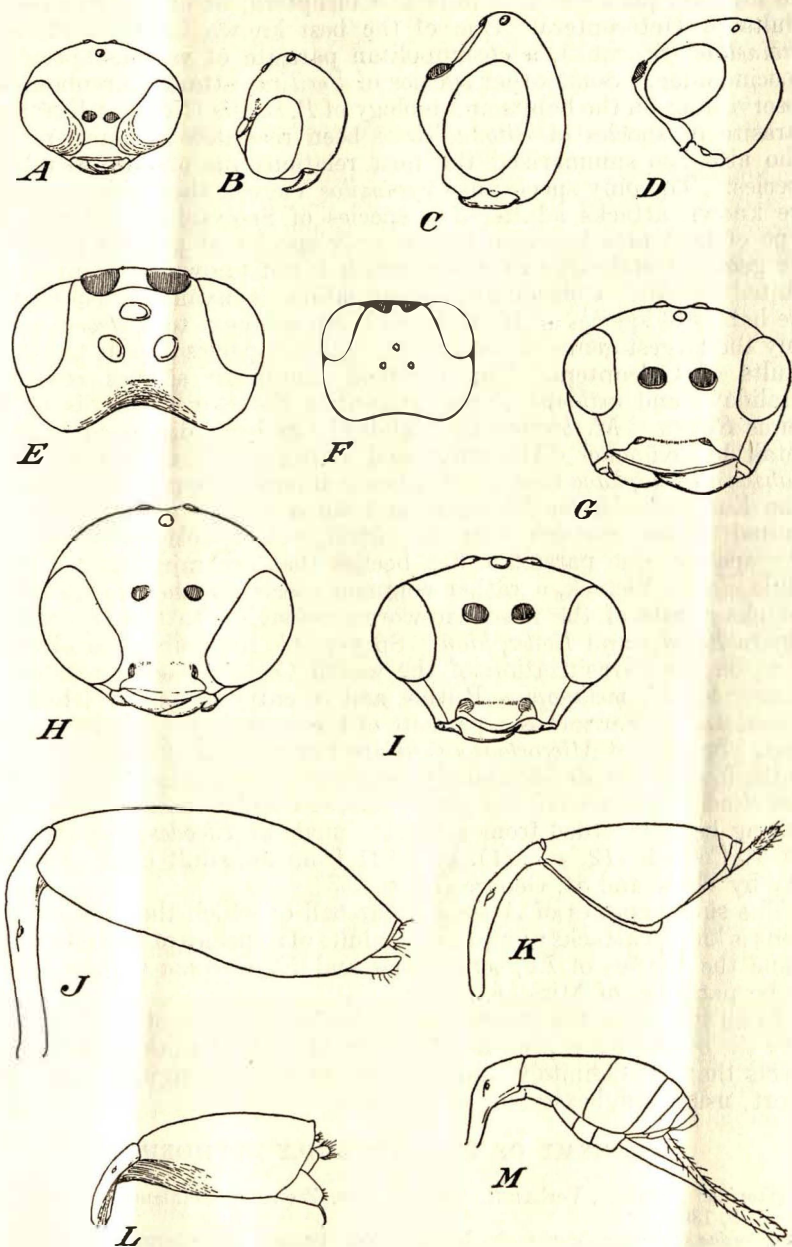


FIGURE 2.—A, Front view, and B, lateral view, of head of *Cryptoxilos convergens*; C, lateral view of head of *Perilitus coccinellae*; D, lateral view of head of *Euphorus spiniscapus*; E, dorsal view of head of *Meteorus vulgaris*; F, dorsal view of head of *Euphoriana uniformis*; G, front view of head of *Syntretus vigilax*; H, front view of head of *Wesmaelia pendula*; I, front view of head of *Myiocephalus boops*; J, lateral view of abdomen of *Aridetus fisheri*; K, lateral view of abdomen of *Euphorus pallipes*; L, lateral view of abdomen of *Perilitus coccinellae*; M, lateral view of abdomen of *Perilitus coccinellae*. (Drawn by Eleanor A. Carlin.)

All other genera of the Euphorinae the habits of which are known are internal parasites of adults of Coleoptera, or of the nymphs or adults of Heteroptera. One of the best known forms is *Perilitus coccinellae* (Schrank), a cosmopolitan parasite of various species of Coccinellidae. Some other species of *Perilitus* attack Curculionidae; observations on the habits and biology of *P. rutilis* (Nees), a European parasite of species of *Sitona*, have been recorded by Jackson (8), who also has summarized the host relationships of certain related species. The only species of *Cryptoxilos* Viereck the habits of which are known attacks adults of a species of Scolytidae. This is the type of host attacked also by the only species at present placed in the genus *Eustalocerus* Foerster, which is not known to occur in the United States. Considerable information is available concerning the habits of species of *Microctonus* Wesmael, next to *Meteorius* probably the largest genus of the group. All the species appear to attack adults of Coleoptera. The common European species *cerealium* (Haliday) and *aethiops* (Nees) parasitize the clover weevils of the genus *Sitona*. *M. brevicollis* (Haliday) has been discussed in some detail by Künckel d'Herculais and Langlois (9) as a parasite of *Haltica ampelophaga* Guér., a flea beetle injurious to grapes in France. The European *bicolor* Wesmael and three species occurring in the United States, *epitricis* Viereck, *vittata*, new species, and *pusillae*, new species, also parasitize flea beetles that are injurious to crops; while *eleodis* Viereck, a rather common species in the Middle West, attacks adults of the false wireworms belonging to the tenebrionid genera *Eleodes* and *Embaphion*. Speyer (14) has published observations on the parasitization of the weevil *Ceutorrhynchus quadridens* Panzer by *M. melanoplus* Ruthe; and recently Grandi (7) has discussed *morimi* Ferriere as a parasite of the cerambycid *Morimus asper* Sulz. Species of *Microctonus* that are parasitic in small hosts, such as the flea beetles, develop singly, only one maturing in a host; others, like *eleodis* and *morimi*, are gregarious, 124 individuals of the former having been recorded from a single female of *Eleodes tricolorata* Say by McColloch (12, p. 221), and 121 from an adult of *E. suturalis* Say by Wade and St. George (15, p. 563).

The single species of *Aridelus* Marshall of which the host associations is known attacks nymphs and adults of a species of Pentatomidae, while the species of *Euphorus* Nees and *Euphoriana* Gahan appear to be parasites of Miridae.

In all species of the genera mentioned as parasites of adult Coleoptera the ovipositor is prominently exerted. On the other hand, those forms that are definitely known to parasitize Heteroptera have very short, usually subexserted, ovipositors.

SYNONYMY OF THE SUBFAMILY EUPHORINAE

- Euphoridae* Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 250, 1862.
Perilitoidae Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 253, 1862.
Euphorides Marshall, Ent. Soc. London Trans. 1887: 51.
Meteorides Marshall, Ent. Soc. London Trans. 1887: 87.
Euphorinae Cresson, Synopsis of the families and genera of the Hymenoptera of America, north of Mexico . . . , p. 60, 1887; Ashmead, U. S. Natl. Mus. Proc. 23: 115, 1900; Szepligeti, Hymenoptera, Fam. Braconidae, in Wytsman, Genera Insectorum, fasc. 22, p. 167, 1904.

Meteorinae Cresson, Synopsis of the families and genera of the Hymenoptera of America, north of Mexico . . . , p. 60, 1887; Ashmead, U. S. Natl. Mus. Proc. 23: 117, 1900; Szepligeti, Hymenoptera, Fam. Braconidae, in Wytsman, Genera Insectorum, fasc. 22, p. 176, 1904.
Helorimorphinae Schmiedeknecht, Die Hymenopteren Mitteleuropas . . . , p. 523, 1907.

CLASSIFICATION OF THE EUPHORINAE

This group has been consistently divided into two subfamilies, based on the number of cubital cells, since the publication of Foerster's classification of the Braconidae (1862). In 1923 (13, p. 4), however, the present writer indicated that the *Meteorinae* do not represent a natural group distinct from the *Euphorinae* and might need to be united with that subfamily. Subsequent study has emphasized the artificial character of the division. Accordingly, the two subfamilies are combined in this publication.

The *Euphorinae* may be characterized as follows:

Head transverse to quadrate; mandibles bidentate, crossing at apices and fitting against clypeus; clypeus separated from face by an impression; anterior margin of clypeus subtruncate, more or less reflexed; maxillary palpi with 5 or 6 segments; labial palpi with 2, 3, or 4 segments; eyes prominent, usually bare or sparsely hairy, very rarely thickly hairy; temples and cheeks margined; occiput usually margined but with the carina often interrupted medially; transverse impression at base of scutellum broad and deep; prepectus margined; legs slender; calcaria of posterior tibia varying from very short to half as long as metatarsus; 2 or 3 cubital cells, very rarely only 1; radial cell ranging from very small and more or less lunate to very large, measured on wing margin in some specimens not more than one-fourth length of stigma, in others extending nearly to apex of wing; rarely, radial cell not defined, the radius lacking; first cubital and first discoidal cells either separated or confluent; recurrent vein very rarely absent; medius ranging from well developed to obsolete; first brachial cell open at apex; subdiscoides not interstitial; submediellian cell large, rarely not defined. First abdominal tergite petiolate, the spiracles at or behind the middle; second and third tergites connate, large, usually but not always carinate at sides, usually overlapping on venter; apical margin of second tergite rarely distinct; ovipositor sheaths either concealed or prominent.

This subfamily is most closely related to the *Leiophroninae*, but can be distinguished by the more definitely petiolate first abdominal tergite and the position of the spiracles of this tergite.

As in most of the major subdivisions of the Braconidae, the subfamily *Euphorinae* contains several more or less anomalous genera, such as *Aridelus*, *Wesmaelia*, *Myiocephalus*, and *Cryptorilos*, the relationships of which are not apparent. However, they align themselves so definitely with the *Euphorinae* on the basis of characters distinguishing this group that they must be placed here. Schmiedeknecht proposed the subfamily *Helorimorphinae* for his genus *Helorimorpha*, but the characters defining it do not appear to be of subfamily value.

KEY TO THE GENERA OF EUPHORINAE

1. Anterior wing with 3 cubital cells; radius composed of 3 abscissae..... 2
 Anterior wing with 2 cubital cells, rarely with only 1, never with 3; radius composed of not more than 2 abscissae, rarely entirely lacking..... 3
2. Lateral margins of second abdominal tergite not carinate; first tergite very long and slender; notauli lacking; radial cell shorter than stigma; antennae always 18-segmented; ovipositor not exerted
 Aridelus Marshall, p. 6.
 Lateral margins of second abdominal tergite carinate; first tergite broadening strongly behind middle; notauli distinct; radial cell longer than stigma; number of antennal segments variable but always more than 18..... *Meteorus* Haliday, p. 8.

KEY TO THE GENERA OF EUPHORINAE—Continued

3. Medius well developed throughout its length..... 4
Medius obsolete or very weak, at least toward base..... 9
4. First cubital and first discoidal cells distinctly separated..... 5
First cubital and first discoidal cells confluent..... 8
5. Thorax depressed, broader than high; recurrent vein, nervellus, and subcostella lacking; medius arcuate; antennae 14-segmented; eyes of female densely hairy..... *Cryptoxilos* Viereck, p. 9.
Thorax not depressed; recurrent vein, nervellus, and subcostella distinct; medius straight; eyes not hairy..... 6
6. Inner calcarium of posterior tibia half as long as metatarsus; frons unusually short; antennae inserted near level of upper eye margins; notauli lacking..... *Centistina* Enderlein, p. 10.
Inner calcarium of posterior tibia much less than half as long as metatarsus; frons normal; antennae inserted near level of middle of eyes; notauli usually distinct..... 7
7. Female antennae very short, clavate, and geniculate; scape and first flagellar segment much lengthened; male unknown..... *Eustalocerus* Foerster, p. 10.
Antennae long and slender, neither clavate nor geniculate..... *Perilitus* Nees, p. 11.
8. Scape unusually long, at least nearly as long as height of head, often much longer..... *Streblocera* Westwood, p. 13.
Scape very short, never more than twice as long as thick..... *Microctonus* Wesmael, p. 14.
9. First abdominal segment unusually long and slender, about twice as long as posterior coxa and trochanter combined, thickest at middle, not carinate at sides..... *Wesmaelia* Foerster, p. 20.
First abdominal segment not as above..... 10
10. Radial cell large, nearly attaining apex of wing; first cubital and first discoidal cells confluent; ovipositor exerted..... 11
Radial cell very short, its apex far from apex of wing; very rarely radial cell lacking; first cubital and first discoidal cells usually separated; ovipositor concealed or subexserted..... 12
11. Abdomen very strongly compressed; tarsal claws simple; submediellian cell complete; propodeal spiracles at or behind the middle; head broad, more or less triangular when viewed from in front; temples flat, receding; legs long and slender, posterior coxae as long as propodeum; scutellum more or less conical..... *Myiocephalus* Marshall, p. 21.
Abdomen not unusually compressed; tarsal claws distinctly cleft; submediellian cell open, submediella lacking and nervellus incomplete; temples convex; posterior coxae shorter than propodeum; scutellum only slightly convex..... *Syntretus* Foerster, p. 22.
12. Radius and nervellus lacking; subcostella incomplete..... *Euphoriella* Ashmead, p. 25.
Radius distinct; nervellus rarely absent; subcostella complete..... 13
13. Cubitus, intercubiti, discoideus, and recurrent vein effaced..... *Euphoriana* Gahan, p. 27.
Cubitus distinct, at least at base, the first cubital and first discoidal cells separated; recurrent vein rarely absent..... *Euphorus* Nees, p. 28.

The Genus *ARIDELUS* Marshall

- Aridelus* Marshall, Ent. Soc. London Trans. 1887: 66. (Genotype, *Aridelus bucephalus* Marshall.)
- Helorimorpha* Schmiedeknecht, Die Hymenopteren Mitteleuropas . . ., p. 523, 1907; Muesebeck, U. S. Natl. Mus. Proc. 79 (art. 16): 13, 1931. (Genotype, *Helorimorpha egregia* Schmiedeknecht.) (New synonymy.)
- Stictometeorus* Cameron, Soc. Ent. 24: 9, 1909. (Genotype, *Stictometeorus rufus* Cameron.) (New synonymy.)
- Erythrometeorus* Cameron, Timehri Jour. Roy. Agr. Comm. Soc. Brit. Guiana (3) 1: 317, 1911. (Genotype, *Erythrometeorus reticulatus* Cameron.) (New synonymy.)
- Scipolabia* Enderlein, Arch. Naturgesch. (Abt. A) 84 (10): 220, 1918. (Genotype, *Scipolabia reticulata* Enderlein.) (New synonymy.)

Marshall's description of *Aridelus* fits *Helorimorpha* exactly except in two respects. He says that the first cubital and the first discoidal

cells are confluent and that the second cubital cell is open outwardly. This does not seem to be the case, however. The present writer has seen a specimen, in the collection of the Hungarian National Museum at Budapest, which is labeled "*bucephalus* M., Coll. Marshall (Trinidad), *Aridelus*", and is undoubtedly either the holotype or a cotype of *Aridelus bucephalus*. This specimen has the first cubital and first discoidal cells separated, the first abscissa of cubitus being complete although weakly pigmented; and it has the second cubital cell closed outwardly by a rather indistinct hyaline second intercubitus, as is frequently the case in specimens of *Helorimorpha*. The species is unquestionably congeneric with the genotype of *Helorimorpha*. Accordingly, it is necessary to place *Helorimorpha*, and the various names previously synonymized with it, as synonyms of *Aridelus*.

The following combination of characters will distinguish the genus:

Head large, transverse to subquadrate, completely margined behind; temples broad; eyes bare, short oval; clypeus large, broad; maxillary palpi 6-segmented; labial palpi 4-segmented; frons with a sharp median carina; antennae always 18-segmented; scape short; flagellum submoniliform; thorax covered with a coarsely reticulate sculpture, or with enormous punctures that are usually contiguous; notauli not distinct; dorsal face of propodeum short; posterior face long, strongly declivous and longitudinally concave medially; anterior wing with first cubital and first discoidal cells separated; three cubital cells, the second small and much narrowed toward base of wing; radius composed of three abscissae, the second very short; radial cell, on wing margin, not longer than stigma; recurrent vein interstitial with first intercubitus or nearly so; medius well developed; nervulus a little postfurcal; first abdominal segment very long and slender, subcylindrical, inserted low between hind coxae, a little curved and slightly broadened behind the spiracles, which are well beyond the middle; remainder of abdomen more or less pyriform, subcompressed apically; fused second and third tergites very large, extending nearly to apex of abdomen and overlapping beneath, dorsally convex and not acute at sides; ovipositor sheaths rather broad, subexserted.

The only published record of a definite host association for a species of *Aridelus* concerns *A. coffeae* (Brues). Recently Wilkinson (17) has reported the rearing of this parasite by R. H. LePelley, in Kenya Colony, Africa, from the pentatomid *Antestia lineaticollis* Stål, an important pest of coffee. In conversation with the present writer Dr. LePelley stated that the parasites emerged from both nymphs and adults of the pentatomid.

The genus is widely distributed, all the major zoogeographical regions being represented among the 15 described species. These species appear to be remarkably similar in structure and sculpture, but they differ rather decidedly in color, ranging from entirely testaceous to entirely black. The Nearctic fauna contains three forms which appear to be separable only by color characters and may be merely color varieties of the same species. They may be distinguished as follows:

Key to the Nearctic Species of Aridelus

Head black; remainder of body testaceous.....(1) *melanderi* (Brues).
 Thorax entirely black; head and abdomen testaceous.....(2) *nigrithorax*, new species.
 Head, thorax, and abdomen testaceous.....(3) *fisheri* (Viereck).

(1) *ARIDELUS MELANDERI* (Brues), new combination

Helorimorpha melanderi Brues, Ent. News 19: 363, 1908.

The holotype, which is in the collection of C. T. Brues, is from Woods Hole, Mass. A specimen in the National collection was taken at Harrisburg, Pa.

(2) *ARIDELUS NIGRITHORAX*, new species

Distinguished from *fisheri* and *melanderi* by its entirely black thorax.

Female.—Length 3.8 mm. Head, as seen from above, subquadrate; temples and cheeks broader than eyes; malar space half as long as eye; face broad, minutely punctate; frons, vertex, temples, cheeks, and occiput polished; ocelli separated by slightly more than the diameter of one of them; first flagellar segment nearly as long as scape and pedicel combined, the following shorter.

Thorax short and stout, mesonotum and propodeum coarsely reticulate; mesopleurum covered with large shallow punctures; radius originating slightly beyond middle of stigma; first abscissa of radius much longer than second but less than half as long as first intercubitus; calcaria of posterior tibia about one-third as long as metatarsus.

Abdomen entirely polished, much narrower than thorax; the first segment nearly as long as remainder of abdomen; ovipositor sheaths very short and rather broad, not extending beyond apex of abdomen.

Head and abdomen testaceous; thorax black or blackish; stemmaticum and antennae black; legs testaceous, with apices of posterior tibiae, and their tarsi entirely, fuscous; wings very weakly infumated; stigma and veins brown; ovipositor sheaths black.

Type locality.—Kerrville, Tex.

Type.—United States National Museum no. 49907.

Described from two female specimens: The type collected by F. C. Pratt, Bureau of Entomology, May 30, 1906; the paratype taken by H. H. Smith at Rosslyn, Va.

(3) *ARIDELUS FISHERI* (Viereck), new combination

(Figs. 1, C; 2, J)

Helorimorpha fisheri Viereck, Ent. News 20: 290, 1909.

Type.—In the United States National Museum.

This form, which seems to differ from *melanderi* only in its entirely yellowish head, and from *nigrothorax* only in its yellow thorax, is the most common Nearctic species. In the collection of the United States National Museum there are 36 specimens from various localities in Virginia, Maryland, Pennsylvania, the District of Columbia, Kentucky, Alabama, Kansas, and Texas.

The Genus *METEORUS* Haliday

Meteorus Haliday, Ent. Mag. 3: 24, 1835. (Genotype, *Ichneumon pendulator* Latreille.)

Protelus Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 253, 1862. (Genotype, *Perilitus chrysophthalmus* Nees.)

Zemiotes Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 253, 1862. (Genotype, *Perilitus albitarsis* Nees.)

Perilitus Foerster (not Nees), Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 253, 1862.

Saprotichus Holmgren, Kongliga Svenska Fregatten Eugenies Resa Omkring Jorden . . . , p. 430, 1868. (Genotype, *Saprotichus chinensis* Holmgren.)

Pachythecus Cameron, Soc. Ent. 27: 84, 1912. (Genotype, *Pachythecus ruficeps* Cameron.) (New synonymy.)

In an earlier paper (13) the writer has discussed this genus and has reviewed the North American species. Accordingly, a detailed treatment of the group will not be repeated here. As noted above, *Pachythecus* Cameron has been found to be an additional synonym of *Meteorus*. The genotype, which is in the British Museum of Natural History, has been recently examined and found to be obviously congeneric with the genotype of *Meteorus*.

The Genus *CRYPTOXILOS* Viereck

Cryptoxilos Viereck, U. S. Natl. Mus. Proc. 40: 180, 1911. (Genotype, *Cryptoxilos dichromorphus* Viereck.)

A rather anomalous genus of Euphorinae, distinguished especially by its depressed thorax, by the strongly hairy eyes of the female, and by the combination of the absence of recurrent vein with the presence of a well-developed arcuate medius and an exserted ovipositor. Further characteristics of the genus follow:

Head not or scarcely broader than thorax, subquadrate, completely margined behind; eyes short oval, prominent, strongly convergent in female; ocelli very small; frons sloping gradually; face short; maxillary palpi 5-segmented; labial palpi 2-segmented; antennae short, with few segments; temples broad, convex. Thorax compact, distinctly broader than high; pronotum not conspicuous; dorsal face of propodeum long and nearly horizontal, its posterior face short, abruptly declivous and somewhat excavated; femora short and a little thickened; stigma short and broad; radial cell on wing margin not longer than stigma; first abscissa of radius punctiform, the second weak or obsolete apically; first cubital and first discoidal cells separated; two cubital cells; submedian cell very narrow; medius somewhat curved; subcostella, nervellus, and submediella absent; abdomen petiolate, more or less pyriform; first tergite narrow; combined second and third tergites comprising nearly all of remainder of abdomen, not carinate laterally, overlapping beneath; ovipositor prominent.

Up to the present the genus has been known only from the unique male type of *C. dichromorphus* Viereck, a South American species. A new Nearctic species, of which both sexes have been obtained, is described below.

CRYPTOXILOS CONVERGENS, new species

(Figs. 1, B; 2, A and B)

Euphorus phloeotribi Ashm., MS., Chittenden, U. S. Dept. Agr., Div. Ent., Insect Life 5: 249, 1893.

This species closely resembles *dichromorphus* but can be distinguished by its somewhat narrower face, by its closely placed 14-segmented antennae, and by the relatively longer first flagellar segment, which is distinctly longer than the second.

Female.—Length 2 mm. Head large, subquadrate, a little wider than thorax; frons long and very gradually declivous; eyes large, prominent, thickly hairy, widely separated behind but very strongly convergent anteriorly, with the result that the face is exceedingly narrow, in its narrowest part only half as wide as long; temples and cheeks broad, strongly convex; ocelli very small, ocellular line four times diameter of an ocellus; head completely margined behind; antennae about as long as head and thorax combined, 14-segmented; scape only a little longer than thick; pedicel about as long as thick; flagellum tapering slightly to the apex, the first segment the longest and thickest, about as long as scape and pedicel combined, the second much shorter than first and slightly shorter than third, remaining segments subequal, about twice as long as broad.

Thorax compact, narrowing behind; notauli more or less distinctly indicated by closely punctate lines; mesoscutum mostly smooth, with a punctate area medially behind; furrow at base of scutellum broad, coarsely foveate; scutellum small, polished; propodeum smooth basally, rugulose beyond, dorsal face long, with a median longitudinal carina, posterior face short and broadly, shallowly excavated; mesopleurum smooth on anterior half, posterior half and metapleurum with large, closely placed punctures; all femora smallest at base, noticeably thickened on posterior two-thirds; posterior coxae smooth; stigma very short and broad, more than two-thirds as broad as long; radial cell on wing margin about as long as stigma; radius originating a little beyond middle of stigma, the first abscissa very short, punctiform, intercubitus almost reaching stigma; second abscissa of radius straight, very weak, more or less obsolete toward wing margin; submedian cell very narrow; first brachial cell not defined; first cubital and first discoidal cells

separated; recurrent vein absent; posterior wing not acute at apex, the venation very faint.

Abdomen strongly petiolate, much narrower than thorax; first segment very slender, nearly parallel-sided, broadening very slightly at apex, longitudinally rugulose aciculate from base to apex, the spiracles at about the middle; ventral margins of first tergite only slightly separated at middle; following tergites polished; fused second and third taking in most of abdomen beyond first tergite, not carinate laterally, the ventral margins overlapping; ovipositor sheaths very slender, as long as first abdominal segment.

Brownish black; face and mouth area brownish yellow; scape, pedicel, and basal two flagellar segments yellowish; anterior legs brownish yellow; middle and posterior legs dark brown, their tibiae and tarsi somewhat paler; wings hyaline; stigma brown; the veins paler.

Male.—Differs from the female as follows: Head more transverse; eyes small, nearly round, not noticeably convergent and only weakly hairy; face broad, much broader than long; first segments of antennal flagellum not distinctly thicker than second; propodeum completely rugulose. Antennae a little paler than in female, only the apex dark.

Type locality.—Tryon, N. C.

Type.—United States National Museum no. 49908.

Host.—*Phthorophloeus frontalis* (Oliv.).

Described from 8 females and 8 males reared in the Bureau of Entomology from adults of the above coleopterous host in mulberry and hackberry; the type under Hopk. U. S. no. 3635m, the allotype and 1 male paratype under Hopk. U. S. no. 3635e, 6 females and 4 males under Hopk. U. S. no. 3680, all from the type locality; 1 female and 1 male under Hopk. U. S. no. 2594e and 1 male under Hopk. U. S. no. 8636, from Kanawha Station, W. Va.

The Genus CENTISTINA Enderlein

Centistina Enderlein, Arch. Naturgesch. (Abt. A) 78 (2): 40, 1912. (Genotype, *Centistina longicornis* Enderlein.)

This genus is known only from the single male specimen, from Madagascar, from which it was characterized by Enderlein. That author assigned the genus to the Leiophroninae, placing it near *Centistes*. It actually belongs in the Euphorinae, however, and in this group appears to be most closely related to *Perilitus*. The following summary of characters is from the type of *C. longicornis*, which is in the Natural History Museum at Stettin, Germany:

Head transverse; face broader than long, rugulose; mandibles fitting against clypeus; clypeus large; eyes elliptical; frons very short, the antennae being inserted very high, just below upper level of eyes; antennae 23-segmented; scape long and slender, at least as long as eyes, slightly curved; pedicel elongate; first flagellar segment long and slender, the following gradually shorter; notauli absent; propodeum strongly declivous behind, but not excavated, closely rugulose; mesopleurum without a furrow; prepectus margined; first abdominal segment petiolate, the tergite somewhat striate longitudinally, its lateral margins extending upon the venter but not meeting; spiracles of first segment slightly behind middle; fused second and third tergites long; dorsum of abdomen beyond first tergite smooth; legs slender; inner calcarium of posterior tibia half as long as metatarsus; nervulus interstitial; medius straight, well developed; lower abscissa of basella about as long as nervellus and much less than half as long as mediella.

The Genus EUSTALOCERUS Foerster

Ropalophorus Westwood, An Introduction to the Modern Classification of Insects, v. 2, Gen. Syn., p. 61, 1840. (Genotype, *Microctonus clavicornis* Wesmael.)

Rhopalophorus Blanchard, Histoire Naturelle des Insectes . . . , v. 3, p. 331, 1840.

Eustalocerus Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 251, 1862.

The original spelling, *Ropalophorus*, represents an obvious error in transcription. Blanchard's emendation, however, is preoccupied in the Coleoptera by *Rhopalophorus* Serville, 1834. Accordingly, *Eustalocerus* Foerster, which was proposed to replace Westwood's name, has been generally adopted.

The genus is known only from the genotypic species, *clavicornis* (Wesm.), which is European. An examination of Wesmael's type shows this species to agree with *Perilitus* in most important respects, but the structure of the antennae is strikingly different. These are very short, 10-segmented, geniculate at the pedicel, and clavate, with the scape and first segment of the flagellum much lengthened, flagellar segments 2 to 7 scarcely as long as thick, and the apical segment nearly as long as the three preceding segments combined. The face is apparently more densely hairy than in *Perilitus* and the posterior face of the propodeum is more strongly excavated medially.

Eustalocerus clavicornis has been recorded by several European authors as a parasite of *Ips typographus* (L.).

Four North American species were described in this genus by Provancher, but none of them belongs here. One, *tauricornis*, has been transferred to *Meteorus* (13, p. 27), while the three remaining species, none of them belonging in the *Euphorinae*, are discussed in this publication (p. 35).

The Genus PERILITUS Nees

Perilitus Nees, Nov. Act. Acad. Nat. Curios 9: 302, 1818; Haliday (Sectio A), Ent. Mag. 3: 34, 1835; Westwood, An Introduction to the Modern Classification of Insects, v. 2, Gen. Syn., p. 61, 1840; Reinhard (Sectio 2), Berlin Ent. Ztschr. 6: 326, 1862; Marshall (in part), Ent. Soc. London Trans. 1887: 71; Thomson (Sectio 1), Opuscula Entomologica, fasc. 16, p. 1740, 1892. (Genotype, *Bracon rutilis* Nees.)

Microctonus Wesmael (in part), Monographie des Braconides de Belgique, p. 54, 1835.

Dinocampus Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 252, 1862; Ashmead, U. S. Natl. Mus. Proc. 23: 116, 1900; Szepilgeti, Hymenoptera, Fam. Braconidae, in Wytsman, Genera Insectorum, fasc. 22, p. 174, 1904. (Genotype, *Perilitus terminatus* Nees.)

In the course of the dismemberment of the group originally given this name, the true identity of the restricted genus *Perilitus* has become more or less obscured. Nees proposed the name for two species which he had previously described in *Bracon*, namely, *Bracon rutilis* and *B. ictericus*. He did not consider of generic importance the fact that the former had 2, and the latter 3, cubital cells. In 1835 Haliday divided *Perilitus* into two groups, retaining *Perilitus* for those forms with 2 cubital cells and proposing *Meteorus* for those with 3. In the same year Wesmael likewise divided *Perilitus* into two groups distinguished by the number of cubital cells, but he applied the name *Perilitus* to those species having 3 cubital cells, and proposed *Microctonus* for those with only 2. In 1840 Westwood clarified this situation by designating *Bracon rutilis* Nees, a species that has only 2 cubital cells, as type of *Perilitus*, and *Ichneumon pendulator* Latreille, having 3 cubital cells, as type of *Meteorus*, thus supporting Haliday's division of the group. Foerster (1862) apparently overlooked these type designations, for he used *Perilitus* in the Wesmaelian sense. At the same time he divided the forms with 2 cubital cells into several genera, restricting *Microctonus* Wesmael as shown below in the treatment of that genus, and proposing *Dinocampus* for *Perilitus terminatus* Nees. This species differs from

typical *Perilitus* in the somewhat longer scape and in having the recurrent vein entering the first cubital cell far from the intercubitus, but is not generically distinct. Ashmead and Szepligeti followed Foerster in the use of *Dinocampus* for *Perilitus* Nees. Both incorrectly applied the name *Perilitus* to *Microctonus* Wesmael as this genus was limited by Foerster. Actually *Perilitus* and *Microctonus* do not represent distinct natural groups. The division, on the basis of the separation or confluence of the first cubital and first discoidal cells, is obviously an artificial one; but since the species arrange themselves so conveniently into two groups by this character, it has been considered advisable to recognize both names as valid.

The following combination of characters distinguishes *Perilitus* from other euphorine genera:

Head transverse, completely margined behind; antennae long and slender, not geniculate; notauli defined; tibial spurs short; two cubital cells; first cubital and first discoidal cells separated; radial cell ending much before apex of wing, not longer than stigma; first abscissa of radius distinct; medius straight, well defined throughout; recurrent vein entering first cubital cell, or interstitial; submediellan cell long, complete; first abdominal segment petiolate, broadening on posterior half; spiracles of first tergite well behind middle; ovipositor prominent, compressed.

Insofar as their habits are known, the species of *Perilitus* appear to be parasitic in adults of certain Coleoptera.

The genus is represented in the Nearctic fauna by two described species, which may be separated as below:

Key to the Nearctic Species of Perilitus

- Scape more than twice as long as thick; pedicel definitely longer than thick; recurrent vein inserted in first cubital cell far from intercubitus; first cubital cell distinctly larger than first discoidal, the latter long-petiolate; lateral lobes of mesoscutum bare.....(1) *coccinellae* (Schrank).
 Scape but little longer than thick; pedicel hardly as long as thick; recurrent vein interstitial with first intercubitus, or nearly; first cubital cell not larger than first discoidal, the latter short-petiolate; mesonotal lobes hairy.....(2) *pyri* (Viereck).

(1) **PERILITUS COCCINELLAE** (Schrank), new combination

(Figs. 1, H; 2, C and M)

Ichneumon coccinellae Schrank, Fauna Boica, v. 2, pt. 2, p. 310, 1802.

Bracon terminatus Nees, Mag. Gesell. Naturf. Freunde Berlin 5: 26, 1811.

Perilitus terminatus Nees, Hymenopterorum Ichneumonibus Affinium, Monographie . . ., v. 1, p. 30, 1834.

Microctonus terminatus Wesmael, Monographie des Braconides de Belgique, p. 63, 1835.

Dinocampus terminatus Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 252, 1862.

Euphorus sculptus Cresson, Canad. Ent. 4: 227, 1872.

Perilitus americanus Riley, U. S. Dept. Agr., Div. Ent., Insect Life 1: 338, 1889.

Dinocampus coccinellae Cushman, Ent. Soc. Wash. Proc. 24: 242, 1922.

The following description, together with the foregoing generic characterization, will identify this species:

Length about 3 to 3.5 mm; face pilose, much broader than long; temples narrow; malar space as long as basal width of mandible; antennae usually 21- to 23-segmented; scape more than twice as long as thick; pedicel longer than thick; all flagellar segments elongate, the basal segment at least four times as long as broad, the following gradually shorter; thorax stout, about as broad as head; notauli represented by broad rugulose lines; a large subquadrate rugulose area at posterior middle of mesoscutum; lateral lobes nearly bare; propodeum rugose, its dorsal face short, its posterior face long, abruptly declivous and

weakly broadly impressed down the middle; stigma not twice as long as broad, slightly longer than radial cell; recurrent vein entering first cubital cell far from intercubitus; abdomen as long as thorax; first tergite depressed, broadening strongly behind middle, finely rugulose, the spiracles not farther from each other than from apex of tergite; second tergite broadening behind, carinate laterally, smooth like the following; ovipositor sheaths as long as posterior femur. Head brownish yellow, stemmaticum and occiput blackish; thorax black; legs brownish yellow; middle and hind coxae more or less piceous; wings subhyaline, stigma and veins brown; first abdominal tergite black; remainder of dorsum of abdomen piceous, brownish yellow apically at sides.

Perilitus coccinellae is a wide-spread parasite of the adults of numerous species of Coccinellidae. According to Baldus (1), it has been recorded from Europe, North America, Hawaii, and New Zealand. The following general localities are represented by material in the collection of the United States National Museum, most of it received from the Bureau of Entomology and Plant Quarantine: District of Columbia, Maryland, West Virginia, Virginia, South Carolina, Alabama, Indiana, Idaho, Oregon, California, New Mexico, Chile, Hawaii, New Zealand, New South Wales, Spain, and Transvaal. Cushman (4, pp. 153-155), Baldus (1), and Goidanich (6, p. 42) have published interesting observations on the biology and host associations of this parasite.

It has been supposed that this species may occur only in the female sex, since there seems to have been no authentic record of the recovery of a male specimen since Nees, in 1834, briefly characterized what he considered to be the male of this species. In the United States National Museum, however, are two male specimens of *P. coccinellae*, both from California, and reared, respectively, from *Hippodamia convergens* Guér. and *Coccinella californica* Mann.

(2) *PERILITUS PYRI* (Viereck), new combination

Dinocampus pyri Viereck, Conn. State Geol. and Nat. Hist. Survey Bull. 22: 225, 1916.

Type.—In the Connecticut Agricultural Experiment Station at New Haven, Conn.

This species differs from *coccinellae* and resembles the genotype, *rutilis* Nees, in its more slender form, much shorter scape and pedicel, less strongly transverse head, more uniformly hairy mesonotal lobes, sharply defined notauli, interstitial recurrent vein, and relatively larger first discoidal cell. It appears to be very similar to the genotype and may prove to be the same species. The writer has not seen adequate material, however, to permit the determination of this point.

Host.—Unknown.

The National collection contains a single male specimen, from Ocean County, N. J. The type was recorded from New Haven, Conn.

The Genus *STREBLOCERA* Westwood

Streblocera Westwood, Phil. Mag. and Jour. Sci. (3) 3: 342, 1833; Reinhard, Berlin Ent. Ztschr. 6: 327, 1862; Thomson, Opuscula Entomologica, fasc. 20, p. 2142, 1895. (Genotype, *Streblocera fulviceps* Westwood.)

Eutanycerus Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 251, 1862. (Genotype, *Eutanycerus halidayanus* Foerster.)

Lecythodella Enderlein, Arch. Naturgesch. (Abt. A) 78 (2): 41, 1912. (Genotype, *Lecythodella garleppi* Enderlein.) (New synonymy.)

Aside from the unusual antennae, this genus is very similar to *Microctonus* Wesmael. The wing venation is the same and the structure of the thorax and abdomen is similar also. The differences in the antennae, however, will readily distinguish the two. In addition to the conspicuous elongation of the scape, the antenna is geniculate, at least in the female, and may be otherwise modified. The ovipositor, while exerted, is shorter than in *Microctonus*.

Eutanycerus halidayanus, except for striking differences in details of the antennal structure and its more prominently exerted ovipositor, agrees with *Streblocera fulviceps* in all important respects. The two are undoubtedly congeneric. Thomson synonymized *E. halidayanus* with *S. macroscapus* (Ruthe), and, although Marshall (11, p. 299) expressed doubt concerning this synonymy, the present writer believes it to be correct. He has seen the types of both species and has found no basis for distinguishing them.

Lecythodella, which is based on a single male specimen from Peru, is known to the writer only from the original description, but there seems to be no reasonable doubt that it belongs here. The supposed differences between *Lecythodella* and *Eutanycerus* mentioned by Enderlein, namely, the shorter vestiture of scape, the interstitial nervulus, and the longer second abdominal tergite, in *Lecythodella*, are at most of specific importance.

No North American representatives of *Streblocera* are known.

The Genus MICROCTONUS Wesmael

Perilitus Haliday (Sectio B), Ent. Mag. 3: 35, 1835; Reinhard (Sectio 1), Berlin Ent. Ztschr. 6: 323, 1862; Marshall (in part), Ent. Soc. London Trans. 1887: 71; Thomson (Sectio 2), Opuscula Entomologica, fasc. 16, p. 1741, 1892; Ashmead, U. S. Natl. Mus. Proc. 23: 116, 1900; Szepligeti, Hymenoptera, Fam. Braconidae, in Wytzman, Genera Insectorum, fasc. 22, p. 170, 1904; Lyle, Entomologist 60: 60, 1927.

Microctonus Wesmael (in part), Monographie des Braconides Belgique, p. 54, 1835; Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 251, 1862. (Genotype, *Perilitus aethiops* Nees.)

Gamosecus Provancher, Nat. Canad. 12: 167, 1880. (Genotype, *Gamosecus mellinus* Provancher.)

As defined by Wesmael, *Microctonus* included all the present Euphorinae with two cubital cells. This author had not recognized *Euphorus* Nees, which had already been described but erroneously placed in the Serphoidea by Nees, or *Streblocera* Westwood, also described earlier; but his definition of *Microctonus* covers these genera as well. In 1840 Westwood (16, v. 2, Gen. Syn., p. 61) designated *Perilitus idalius* Haliday type of *Microctonus*, but this species was not originally included in that genus and therefore was not available as type. In 1862 Reinhard, following Westwood, restricted *Microctonus* to species combining an elongate radial cell, confluent first cubital and first discoidal cells, lack of distinct notauli, and exerted ovipositor, while he used *Perilitus* for species with a short radial cell, trilobed mesoscutum, and exerted ovipositor. The latter group he then divided into two sections, section 1 containing species having the first cubital and first discoidal cells confluent, and section 2, species with these cells separated. Earlier in the same year, however, Foerster had proposed *Syntretus* for *Microctonus* in the sense of Westwood and Reinhard, naming *Microctonus vernalis* Wesmael as type, and had applied the name *Microctonus* Wesmael to those forms placed by Reinhard in *Perilitus*, section 1. As type of *Microctonus* Foerster

named *Perilitus aethiops* Nees, a species originally included by Wesmael and available as type.

Most workers in the Braconidae since the publication of Foerster's classification have overlooked or disregarded his type fixation in the case of *Microctonus* and have used this name in the sense of *Syntretus*, while the true *Microctonus* has been called *Perilitus*.

Microctonus Wesmael, which differs from *Perilitus* only in having the first cubital and the first discoidal cells confluent, may be recognized by the following general characterization:

Head transverse, although with temples strongly convex and as broad as eyes; temples and cheeks margined; occiput usually margined, but the carina frequently interrupted medially; antennae long, not geniculate; scape very short, less than twice as long as thick; thorax not depressed; notauli distinct; impression at base of scutellum large, deep; propodeum usually somewhat excavated medially behind; two cubital cells, the first confluent with first discoidal; radial cell not longer than stigma, its apex far from apex of wing; medius well developed, straight; submediellian cell complete; legs slender; first abdominal segment petiolate, broadening behind, its spiracles beyond middle; second tergite carinate laterally; ovipositor prominently exerted.

Insofar as their habits are known, the species of this genus are parasitic in the adults of Coleoptera, the Chrysomelidae, Carabidae, Curculionidae, Cerambycidae, Alleculidae, and Tenebrionidae being represented among the known hosts. The individual species, however, seem to be rather sharply restricted in host associations.

The National collection contains field-collected specimens of several undescribed species; as yet, however, these are represented by too inadequate or unsatisfactory material to warrant description. As shown below, *Microctonus agilis* Cresson and *M. linearis* Provancher do not belong in the Euphorinae.

Most of the species are not readily distinguished unless close attention is given to minute details.

Key to the Nearctic Species of *Microctonus*

1. Basella broken much above the middle, lower abscissa much longer than nervellus; first abscissa of radius much more than half as long as width of stigma; radial cell more than half as long as stigma; lateral lobes of mesoscutum darker than middle lobe
(1) *carabivorus*, new species.
- Basella broken at or below the middle, very rarely a little above middle but then first abscissa of radius shorter; radial cell variable; lobes of mesoscutum unicolorous..... 2
2. Posterior margin of second tergite distinctly defined; face more than one and one-half times as broad as long; temples and cheeks as broad as eyes; radial cell slightly more than half as long as stigma; wings subhyaline; antennae with 21 or 22 segments. Known only in female sex..... (2) *gastrophysae* (Ashmead).
- Posterior margin of second tergite not distinctly marked; otherwise not the above combination of characters..... 3
3. Propodeum closely rugulose, exareolate; nervellus definitely longer than longest marginal cilia of posterior wing; antennae of female with 21 to 34 segments, those of male with 25 to 40; length 2 to 4 mm..... 4
- Propodeum reticulate rugulose, more or less areolated; nervellus not distinctly longer than longest marginal cilia of posterior wing; antennae of female with 17 to 20 segments, those of male with 21 to 24; length usually less than 2 mm..... 5
4. Mesoscutum, including lateral lobes, rather evenly pubescent; stigma yellowish hyaline; antennae 28- to 34-segmented in female, 35- to 40-segmented in male..... (3) *mellinus* (Provancher).
- Surface of lateral mesonotal lobes bare or with only a few scattered hairs near notauli; stigma brown; antennae of female 21- to 23-segmented, those of male 25- to 27-segmented..... 5

Key to the Nearctic Species of Microdonus—Continued

5. Radial cell about half as long as stigma; second abscissa of radius strongly arched..... (4) *eleodis* (Viereck).
Radial cell nearly as long as stigma; second abscissa of radius weakly curved..... (3) *nigritus* (Provancher).
6. First abdominal tergite without lateral carinae from spiracles toward base, three times as long as broad at apex, the petiole very slender and smooth; face smooth and shining; temples and cheeks narrower than eyes..... (6) *epitricis* (Viereck).
First abdominal tergite with lateral carinae from spiracles toward base, not three times as long as broad as apex, the petiole usually more or less sculptured; face finely punctate or granular; temples and cheeks, at least in male, as broad as eyes.....
7. Middle lobe of mesoscutum irregularly weakly punctate or wrinkled, hairy; no median carina posteriorly on mesoscutum; malar space as long as basal width of mandible; first abscissa of radius about half as long as width of stigma; lower abscissa of basella not so long as nervellus. Known only in female sex..... (7) *vittatae*, new species.
Middle lobe of mesoscutum smooth, and bare except for a few scattering hairs in front; a median longitudinal carina posteriorly on mesoscutum; malar space shorter than basal width of mandible; first abscissa of radius less than half width of stigma; lower abscissa of basella as long as nervellus..... (8) *pustillae*, new species.

(1) *MICROCTONUS CARABIVORUS*, new species

(Fig. 1, I)

Superficially rather similar to *mellinus*, but readily distinguished by the bare lateral lobes of the mesoscutum, the narrow stigma, the unusually long lower abscissa of basella, the more or less areolated propodeum, and by having fewer segments in the antennae.

Female.—Length 2.5 mm. Head transverse; eyes large, prominent, nearly twice as broad as temples; occipital carina only very narrowly interrupted medially; face not broader than long, nearly smooth; malar space much shorter than basal width of mandible; frons smooth except for slight roughening just above antennae; vertex convex; postocellar line about twice diameter of an ocellus and a little shorter than ocellular line; antennae about as long as body, 24-segmented; flagellum of uniform thickness throughout, its basal segment slightly longer than second; scape one and one-half times as long as pedicel.

Thorax much narrower than head, very sparsely pubescent; notauli foveolate, lateral mesonotal lobes polished and bare, the middle lobe with scattered, very shallow punctures and sparse pubescence; impression at base of scutellum broad and deep, divided by a prominent median longitudinal carina; scutellum very small; propodeum irregularly coarsely reticulate, with a suggestion of areolation, rather abruptly declivous behind; side of pronotum smooth except for a few rugae in the longitudinal impression; mesopleurum mostly polished, with a coarsely foveolate longitudinal groove below; stigma narrow; radial cell about two-thirds as long as stigma; first abscissa of radius perpendicular to anterior margin of wing, more than half as long as width of stigma, and longer than nervellus; second abscissa only slightly curved; lower abscissa of basella much longer than upper abscissa or nervellus; nervellus not distinctly longer than longest marginal cilia of posterior wing; legs very slender; hind coxae polished.

Abdomen a little longer than thorax and nearly as wide in its widest part; first tergite long and slender, longer than second and third combined, three times as long as broad at apex, more or less striate, smooth at apex, the spiracles a little beyond middle; ovipositor sheaths very slender, longer than hind femur but not so long as hind tibia.

Testaceous; antennal flagellum brownish, a little paler below toward base; ocellar area, lateral lobes of mesoscutum, and more or less of dorsal face of propodeum somewhat piceous; middle lobe of mesoscutum and scutellum ferruginous; legs entirely yellow; wings hyaline, stigma pale brown, its margins slightly darker, veins yellowish hyaline; lateral edges of postpetiole of first tergite blackish.

Male.—Essentially as in the female except that the antennae are considerably longer than the body, 26-segmented in the allotype, with first flagellar segment not longer than second; and the face, temples, and cheeks relatively broader.

Type locality.—Lake Smith, near Norfolk, Va.

Type.—United States National Museum no. 49909.

Host.—*Galerita* sp.

Seven females and three males reared from adults of the above host May 4, 1926, by H. E. Ewing, and one female bearing Iowa Experiment Station accession no. 739 without further data.

(2) *MICROCTONUS GASTROPHYSAE* (Ashmead), new combination

Perilitus gastrophysae Ashmead, U. S. Natl. Mus. Proc. 11: 641, 1888.

Type.—In the United States National Museum.

Length 2 to 2.5 mm. Face broad, more than one and one-half times as broad as distance between antennal foramina and base of clypeus, mostly finely rugulose; malar space about as long as basal width of mandible; temples and cheeks about as broad as eyes; antennae with 21 to 22 segments; first flagellar segment slightly longer than second; postocellar line nearly three times as long as diameter of an ocellus; occipital carina well developed, narrowly interrupted medially; notauli punctate or foveolate; lateral lobes of mesoscutum with only a few scattered hairs along inner and anterior margins; propodeum rugose reticulate, sometimes with a suggestion of areolation; radial cell distinctly more than half as long as stigma; first abscissa of radius very short, somewhat oblique; second abscissa of radius not strongly curved; lower abscissa of basella subequal to upper abscissa and to nervellus; nervellus slightly inclivous; abdomen in widest part as wide as thorax; first tergite a little more than twice as long as broad at apex, closely aciculate from base to apex; suture between second and third tergites distinctly indicated; ovipositor sheaths as long as posterior femur.

Head brownish yellow, sometimes mostly piceous above and behind; antennae dark brown, scape and pedicel paler; thorax black or piceous; abdomen varying from brown to black; wings subhyaline; stigma and veins brown; a small yellowish spot beyond apex of first brachial cell.

Distribution.—District of Columbia; Virginia.

Hosts.—*Gastroidea cyanea* Melsheimer; *G. viridula* (Degeer).

In addition to the 2 females comprising Ashmead's type material, the National Museum has a series of 8 females reared from *G. viridula* at Barcroft, Va., May, 1927, by J. C. Bridwell.

(3) *MICROCTONUS MELLINUS* (Provancher), new combination

Gamosecus mellinus Provancher, Nat. Canad. 12: 168, 1880.

Perilitus mellinus Provancher, Additions et Corrections au Volume II de la Faune Entomologique du Canada traitant des Hyménoptères 1888, p. 379.

Type.—In the Provincial Museum, Quebec, Canada.

Length 3 to 4 mm. Face weakly indefinitely sculptured; malar space about as long as basal width of mandible in male, a little shorter in female; temples strongly convex in male and about as broad as eyes, only slightly convex and narrower than eyes in female; antennae longer than body, with 28 to 34 segments in female and 35 to 40 in male; notauli foveolate; mesoscutum with a rugulose area on posterior middle; lobes smooth, hairy; propodeum coarsely rugose, exareolate, strongly declivous behind, the posterior face longer than the dorsal face and conspicuously excavated down the middle; side of pronotum mostly rugulose; stigma large; radial cell nearly as long as stigma; lower abscissa of basella not longer than upper abscissa; abdomen narrower than thorax; first abdominal tergite more than three times as long as broad at apex, fully as long as posterior femur, longitudinally aciculate, smooth at base; ovipositor sheaths longer than first tergite.

Female entirely yellow, with antennae brown, paler toward base, and propodeum occasionally somewhat brownish; male with dorsum of thorax more or less piceous or brownish; wings hyaline; subdiscoideus pigmented to wing margin; a small faintly discolored spot beyond apex of first brachial cell; stigma yellowish hyaline, margined with brown.

The National collection contains 6 specimens from the District of Columbia and points nearby in Maryland and Virginia, also 2 specimens without locality data. In addition to these specimens and the type, the writer has seen 3 specimens at the Bureau of Entomology and Plant Quarantine Laboratory, Melrose Highlands, Mass., which were taken at North Saugus, Mass., and one in the collection of the Academy of Sciences of Philadelphia, which is from Georgia. The host is unknown.

(4) *MICROCTONUS ELEODIS* (Viereck), new combination

Perilitus eleodis Viereck, U. S. Natl. Mus. Proc. 44: 561, 1913.

Type.—In the United States National Museum.

Similar to *gastrophysae* (Ashmead), but differing from the foregoing description of that species as follows:

Face smooth or very weakly punctate; malar space shorter than basal width of mandible; cheeks and temples not so wide as eyes in female; antennae of female 22- to 23-segmented, rarely 21-segmented; those of male with 25 to 27 segments; occipital carina a little more broadly interrupted medially; propodeum closely regulose, exareolate; metapleurum closely rugulose punctate; radial cell not more than half as long as stigma; first abscissa of radius usually not oblique; nervellus not inclivous; petiole of first abdominal tergite smooth basally; suture between second and third tergites not distinct; ovipositor sheaths varying from as long as posterior femur to longer than posterior tibia. Color of thorax varying from testaceous, with dorsum more or less piceous, to entirely piceous black; abdomen varying from mostly brownish yellow to piceous; wings clear hyaline; stigma and veins brown; no discolored spot beyond apex of first brachial cell.

The collection in the National Museum contains nearly 200 specimens of this species, showing the following range in distribution: Kansas, Nebraska, Colorado, New Mexico, Idaho, and Washington. This material consists almost entirely of reared specimens, the hosts being adults of the following Tenebrionidae: *Eleodes suturalis* (Say), *E. opaca* (Say), *E. obsoleta* (Say), *E. hispilabris* (Say), *E. extricata* (Say), *E. tricolorata* (Say), *E. vandykei* Blaisdell, *Embaphion muricatum* Say, and *E. planum* Horn.

(5) *MICROCTONUS NIGRITUS* (Provancher), new combination

Perilitus nigrinus Provancher, Additions et Corrections au Volume II de la Faune Entomologique du Canada, traitant des Hyménoptères, 1888, p. 379.

Type.—In the Provincial Museum, Quebec, Canada.

Agrees very closely with *eleodis* (Viereck), but the definitely longer radial cell and very weakly curved second abscissa of radius will distinguish it from that species. Instead of being 0.22 inch in length, as stated by Provancher, the type is about 2.2 mm long.

Known only from the type, which is from St. Gertrude, Quebec, and a single specimen in the United States National Museum, from Agricultural College, Mich.

(6) *MICROCTONUS EPITRICIS* (Viereck), new combination

Perilitus epitricis Viereck, U. S. Natl. Mus. Proc. 42: 625, 1912.

Type.—In the United States National Museum.

The female agrees with the description of *vittatae*, except as follows:

Temples and cheeks definitely narrower than eyes; face smooth and shining; antennae 20- or 21-segmented; lateral ocelli on a line with posterior margins of eyes; middle lobe of mesoscutum smooth and polished, with only a few scattered hairs anteriorly; mesopleurum with a very short punctate or foveolate groove

below, sometimes with only a row of 3 or 4 punctures; first abdominal tergite three times as long as broad at apex, weakly longitudinally sculptured, not carinate laterally, the petiole very slender, smooth.

Both sexes occur. The male specimens studied have the antennae 22- to 24-segmented, and have the frons, vertex, and occiput, the thorax mostly, and usually the abdomen beyond the first tergite, piceous.

In addition to the type series of 5 specimens, which were reared from *Epitrix parvula* Fab. in Tennessee, the National Museum has 13 specimens reared from the same host at Columbus, Ohio, in August and September 1934 by Alvah Peterson, 2 specimens from New Jersey reared from *E. cucumeris* Harris, and 2 field-collected specimens from Maryland and Illinois, respectively.

(7) *MICROCTONUS VITTATAE*, new species

Very similar to *epitricis* (Viereck), with which it has been confused, but differing in its finely granular face, more closely sculptured and less slender first abdominal tergite, the presence of distinct lateral carinae on the first tergite from spiracles toward base, the somewhat punctate middle lobe of mesoscutum, and the relatively broader temples and cheeks.

Female.—Length 1.8 mm. Head much broader than thorax; temples and cheeks broad and convex, nearly as broad as eyes, polished; face at narrowest point slightly broader than long, finely granular or shagreened, covered with short appressed hair; malar space about as long as basal width of mandible; eyes prominent; antennae nearly as long as body, 19-segmented; scape less than one and one-half times as long as thick; pedicel three-fourths as long as scape and a little longer than thick; first flagellar segment nearly as long as scape and pedicel combined, not, or only faintly, longer than second; basal three flagellar segments more slender than pedicel and also slightly more slender than following segments of flagellum; ocelli small; postocellar line more than twice diameter of an ocellus and nearly as long as ocellular line; lateral ocelli slightly behind line of posterior eye margins; temples and cheeks weakly carinate behind, the occiput immargined, or the carina faint or broadly interrupted medially.

Thorax narrow; notauli complete, punctate; lobes of mesoscutum not prominent, the middle lobe weakly irregularly punctured and distinctly hairy, the lateral lobes polished and bare; impression at base of scutellum deep, divided into two large smooth pits by a median carina; propodeum reticulated and more or less areolated, smooth at base each side of middle, rather strongly declivous behind and somewhat excavated medially on posterior face; mesopleurum smooth and shining, with a small rugulose area below; metapleurum weakly roughened, shining; legs slender; stigma more than twice as long as broad; radius originating slightly beyond middle of stigma; first abscissa of radius about half as long as width of stigma; second abscissa strongly curved; radial cell nearly half as long as stigma; nervellus longer than lower abscissa of basella but not distinctly longer than longest marginal cilia of posterior wing.

Abdomen about as wide as thorax; first tergite not three times as long as wide at apex, longitudinally aciculated, carinate at sides before spiracles as well as behind; remainder of abdomen polished; ovipositor sheaths about as long as posterior femur.

Head yellow; antennae dark brown, paler at base; thorax brownish yellow, piceous above; abdomen and legs brownish yellow; wings hyaline, stigma and veins pale brown.

Type locality.—Columbus, Ohio.

Type.—United States National Museum no. 49910.

Host.—*Phyllotreta vittata* Fab.

Described from the following 69 female specimens: The type and 39 additional specimens reared by A. Peterson at the type locality, from the above host; 14 specimens reared by W. H. White at Arling-

ton, Va., August 14, 1916, from *P. vittata*; 7 labeled "Bred from *Phyllotreta*, Aug. 20, 09, Arlington, Va., Smyth and Jones Coll."; 7 from *P. vittata*, Washington, D. C., August 9, 1906; and 1 from the same host, Baton Rouge, La., November 10, 1931. This material exhibits some color variation, the thorax sometimes being mostly piceous and the abdomen more or less piceous beyond the first tergite. The antennae are nearly always 19-segmented, as in the type, rarely 18- or 20-segmented.

(8) MICROCTONUS PUSILLAE, new species

Exceedingly like *vittatae*, from which it differs, however, in its slightly shorter malar space, smooth and nearly bare middle lobe of mesoscutum, the presence of a distinct median longitudinal carina behind the middle lobe of the mesoscutum, and the, usually, relatively shorter first abscissa of radius. Both sexes occur, while in *vittatae* only females are known.

Female.—Length about 1.5 mm. Agrees with description of *vittatae* except as follows: Malar space slightly shorter than basal width of mandible; antennae 18-segmented; middle lobe of mesoscutum smooth and practically bare, the pubescence restricted to a few scattered hairs anteriorly; propodeum not smooth and shining at base each side of middle; first abscissa of radius much less than half as long as width of stigma; lower abscissa of basella about as long as nervellus.

Male.—Much darker in color than female, the head except mouth region entirely black, thorax entirely black or blackish and abdomen mostly piceous; antennae a little longer than body, 22-segmented; propodeum a little smoother at base than in female; temples and cheeks fully as broad as eyes.

Type locality.—Rocky Ford, Colo.

Type.—United States National Museum no. 49911.

Host.—*Phyllotreta pusilla* Horn.

Described from 11 females and 12 males reared by H. O. Marsh, of the Bureau of Entomology, June, July, and August 1916, under Chittenden nos. 3133 and 3134. The female paratypes vary in color as in *vittatae*; the antennae of the female are nearly always 18-segmented, rarely 17-segmented; those of the male paratypes have from 21 to 23 segments. The National collection contains also 7 field-collected specimens from Idaho; these are not included in the type series. This is the species referred to by Chittenden and Marsh (3, p. 13) under the name *Perilitus epitricis* Viereck, in their discussion of *Phyllotreta pusilla*, the western cabbage flea beetle.

The Genus WESMAELIA Foerster

Wesmaelia Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 251, 1862. (Genotype, *Wesmaelia pendula* Foerster.)

Head large, although hardly subquadrate, completely margined behind; eyes prominent; antennae slender, the scape short; notauli impressed; posterior face of propodeum long, rather abruptly declivous and broadly excavated down the middle; legs slender, coxae very small; medius weak; two cubital cells; first cubital and first discoidal cells separated; radial cell at least no longer than stigma; second abscissa of radius curved; recurrent vein nearly interstitial with intercubitus; first abdominal segment unusually long and slender, about twice as long as posterior coxa and trochanter combined, and but little broader than high, not carinate at sides, slightly thickest at the spiracles, which are at about the middle; remainder of abdomen subcompressed; second and third tergites fused, occupying most of dorsum of abdomen and overlapping beneath; ovipositor sheaths exerted, but short.

In the writer's opinion there is but one known species of this genus, although it has been described under four different names, twice from Europe, once from the United States, and once from Asia (Turkestan).

WESMAELIA PENDULA Foerster

(Figs. 1, J, 2, H and K)

Wesmaelia pendula Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 251, 1862.

Wesmaelia cremasta Marshall, Ent. Monthly Mag. 8: 257, 1872. (New synonymy.)

Wesmaelia americana Myers, U. S. Nat. Mus. Proc. 53: 293, 1917. (New synonymy.)

Wesmaelia asiatica Shestakov, Zool. Anz. 99: 261, 1932. (New synonymy.)

A study of the type specimens of *pendula*, which are in the Zoological Museum at Berlin, and those of *americana*, which are in the United States National Museum, has convinced the writer that these names are synonymous; and the descriptions of *cremasta* and *asiatica* agree so completely with the types of *pendula* and *americana* that there can be little doubt that all four names apply to the same species.

The above generic characterization combined with the following description will distinguish the species:

Length 3.5 to 4 mm. Eyes strongly convergent below; face and frons minutely punctate; frons with a fine median longitudinal carina arising just above insertion of antennae; antennae normally with 24 to 28 segments, shorter than body; basal flagellar segment as long as scape and pedicel combined; occiput, temples, and cheeks polished; mesoscutum smooth, with a large triangular rugulose area posteriorly; the middle lobe short; propodeum completely rugose; ovipositor sheaths shorter than posterior metatarsus. Yellow; antennae pale, fuscous apically; propodeum more or less blackish; wings hyaline; apex of first abdominal tergite sometimes piceous; ovipositor sheath black.

The species is widely distributed over the United States, the National collection containing specimens from Maryland, Pennsylvania, New York, Indiana, Kansas, Iowa, New Mexico, South Dakota, Colorado, Idaho, and Washington; there is included also one from Ottawa, Canada. The host relations are not certainly known. A specimen from Kansas is labeled "Reared from Hessian fly", but this record apparently needs confirmation before it can be accepted as correct.

The Genus MYIOCEPHALUS Marshall

Myiocephalus Marshall, in Andre, Species des Hyménoptères d'Europe & d'Algérie, 5 bis, p. 218, 1897. (Genotype, *Microctonus boops* Wesmael.)

Spilomma Morley, Ent. Monthly Mag. (2) 20: 211, 1909. (Genotype, *Spilomma falconivibrans* Morley.) (New synonymy.)

Readily distinguished from other Euphorinae by its very strongly compressed abdomen; broad, more or less triangular (viewed from in front) head; large posterior coxae, which are as long as propodeum; and position of the propodeal spiracles which are at, or a little behind, the middle. Eyes large and very prominent, especially in the female; face broadly shallowly impressed in the female, weakly convex in the male; head completely margined behind; temples rather flat, sloping strongly from the eyes; antennae long and slender; scape short; notauli not distinctly impressed; impression at base of scutellum very broad and deep, not divided by longitudinal carinae; scutellum small, somewhat conical; posterior face of propodeum strongly declivous and medially excavated; legs unusually long and slender; stigma rather narrow; two cubital cells; medius obliterated toward base; first cubital and first discoidal cells confluent; radial cell nearly attaining apex of wing; submediellian cell large, complete; abdomen strikingly compressed; ovipositor exerted.

Morley's description and wing figure leave no room for doubt that *Spilomma* is identical with *Myiocephalus*. Furthermore, it appears very probable that his species *falconivibrans* will prove to be the same as *boops* (Wesmael), but owing to certain minor discrepancies between the type of *boops* and the description of *falconivibrans*, it seems best not to suppress the latter without first having studied the type.

MYIOCEPHALUS BOOPS (Wesmael)

(Figs. 1, G; 2, I)

Microctonus boops Wesmael, Monographie des Braconides Belgique, p. 59, 1835.
Gamosecus laticeps Provancher, Additions et Corrections au Volume II de la Faune Entomologique du Canada traitant des Hyménoptères, 1886, p. 126.
Microctonus laticeps Provancher, Additions et Corrections au Volume II de la Faune Entomologique du Canada traitant des Hyménoptères, 1888, p. 379.
Myiocephalus boops Marshall, in Andre, Species des Hyménoptères d'Europe & d'Algérie, v. 5 bis, p. 218, 1897.

The writer has studied both the type of *boops*, which is in the Academy of Sciences at Brussels, and that of *laticeps*, which is in the Provincial Museum at Quebec, and is of the opinion that the two are conspecific.

The following description, together with the generic diagnosis given above, will readily distinguish the species:

Length about 3.5 to 4 mm. Clypeus strongly convex, the basal foveae unusually large and distinct; face broad, minutely granular and opaque; malar space longer than basal width of mandible, longer in male than in female; frons finely granular, with some weak transverse striae below median ocellus; antennae longer than the body, about 30-segmented; vertex finely coriaceous; thorax mostly finely shagreened; propodeum indefinitely finely sculptured, with a weak median carina basally and with carinae bounding the impression on posterior face; first abdominal segment very narrow, with conspicuous glymmæ at base; ovipositor sheaths a little shorter than first abdominal segment. Head yellow, vertex broadly black, antennae dark brown, scape and pedicel yellowish; thorax black above, yellow on sides and below; first abdominal tergite blackish, remainder of abdomen yellowish brown; legs entirely yellow; wings hyaline.

The writer has seen only 3 North American specimens, the type of *laticeps* and 2 specimens in the National collection, a female from Ottawa, Canada, and a male from Stony Island, N. Y., the latter collected July 8, 1896.

The host is unknown. It should be noted, however, that Morley has recorded *falconivibrans* from a nest of *Formica rufa* Latr.

The Genus SYNTRETUS Foerster

Perilitus Haliday (Sectio C), Ent. Mag. 3: 38, 1835.

Microctonus Wesmael (in part), Monographie des Braconides Belgique, p. 54, 1835; Westwood, An Introduction to the Modern Classification of Insects, v. 2, Gen. Syn., p. 61, 1840; Marshall, Ent. Soc. London Trans. 1887: 81; Ashmead, U. S. Natl. Mus. Proc. 23: 116, 1900; Viereck, U. S. Natl. Mus. Bul. 83: 94, 1914.

Syntretus Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 251, 1862; Szepligeti, Hymenoptera. Fam. Braconidae, in Wytsman, Genera Insectorum, fasc. 22, p. 172, 1904. (Genotype, *Microctonus vernalis* Wesmael.)

When Foerster described *Syntretus*, in 1862, he named *Microctonus vernalis* Wesmael as type. At the same time he designated *Perilitus aethiops* Nees type of *Microctonus* Wesmael. This was the first valid type fixation for *Microctonus*, Westwood's designation of *Perilitus idalius* Haliday, in 1840, being unacceptable since that species was not originally included. Nevertheless, the name *Microctonus* has been generally employed for the group which is typified by *idalius* and *vernalis* rather than *aethiops*, *Syntretus* having been treated as a synonym. Only Szepligeti appears to have used *Syntretus* properly, as the valid name for this group, but he left the identity of the true *Microctonus* in doubt. As late as 1914 Viereck named *Microctonus vernalis* type of *Microctonus*, disregarding Foerster's

fixation, and accordingly held *Microctonus* and *Syntretus* to be isogenotypic. They are, however, neither isogenotypic nor synonymous. *Syntretus* must replace *Microctonus* of authors, while *Microctonus* Wesmael is to be used for *Perilitus* authors, not Nees, as has been shown above in the discussion of that genus.

The following brief description will distinguish the genus *Syntretus*:

Head transverse but not strongly so, only slightly broader than thorax; antennae slender; scape very short, not, or but little, longer than pedicel; pedicel longer than thick; occiput margined; notauli usually not or faintly impressed; tarsal claws cleft at apices; stigma large; radial cell on wing margin longer than stigma and usually nearly attaining wing apex; first cubital and first discoidal cells confluent; second intercubitus absent; second abscissa of radius nearly straight; medius obsolete or very weak, at least toward base; submediella lacking; nervellus represented by only a short spur; first abdominal segment strongly petiolate, its spiracles beyond the middle; the fused second and third tergites broad, carinate laterally, at least toward base; ovipositor prominently exerted.

Only one North American species belonging to this genus has been described. Two additional species are described in this publication. The host associations are unknown.

Key to Nearctic Species of *Syntretus*

1. Propodeum evenly convex, completely smooth and polished, exareolate; stigma three times as long as broad; antennae much longer than head and thorax combined----- (1) *venustus*, new species.
Propodeum with a large, more or less impressed, median area defined by carinae and extending nearly the entire length of propodeum; stigma not more than twice as long as broad; antennae not, or hardly, longer than head and thorax combined----- 2
2. Metacarpus not distinct; radius weak; propodeum deeply excavated down middle; malar space at least half as long as eye
(2) *vigilax* (Provancher).
Metacarpus and radius well developed; propodeum only weakly impressed medially behind; malar space much shorter
(3) *brevicornis*, new species.

(1) *SYNTRETUS VENUSTUS*, new species

At once distinguished from the other North American species of *Syntretus* treated in this publication by its smooth and polished, exareolated propodeum.

Female.—Length 3 mm. Head transverse, although with temples convex and about as broad as the eyes; face slightly convex, with scattered indistinct punctures, hardly broader at level of lower eye margins than at level of insertion of antennae; malar space fully as long as basal width of mandible; frons, vertex, and temples smooth and shining; postocellar line and ocellular line subequal, nearly or quite twice the diameter of an ocellus; occipital carina complete, low; antennae considerably longer than head and thorax combined, tapering to apex, 28-segmented; scape not more than one and one-half times as long as thick; pedicel a little longer than thick and three-fourths as long as scape; first flagellar segment longer than scape; the following rather abruptly shorter, those after the second subequal, all longer than thick.

Thorax at tegulae not distinctly narrower than head; mesoscutum polished; notauli entirely lacking; impression at base of scutellum large, with a low median carina; propodeum evenly convex, smooth and polished, with a short longitudinal ridge at apex on each side of abdominal foramen; side of pronotum, mesopleurum, and metapleurum smooth and shining; legs slender; stigma long and narrow, about three times as long as its greatest breadth; metacarpus distinctly attaining apex of radial cell; radial cell extending nearly to apex of wing, longer than the elongate stigma; first abscissa of radius more than half as long as greatest width of stigma.

Abdomen much narrower than thorax, subcompressed, entirely polished; first tergite broadening slightly beyond spiracles, which are somewhat behind

middle; second and third tergites combined a little longer than combined length of following tergites; ovipositor sheaths nearly as long as the first tergite.

Head testaceous with a piceous spot enclosing ocelli; thorax testaceous with the dorsum blackish or piceous; first abdominal tergite blackish, the following mostly yellowish, the apical tergites more or less piceous; legs entirely yellow except tarsi, which are somewhat dusky; wings hyaline; stigma yellowish hyaline, margined with brown; radius and metacarpus brown; other veins paler.

Type locality.—Langdale, Chambers Co., Ala.

Type.—United States National Museum no. 49912.

Described from a single female specimen collected by H. H. Smith.

(2) *SYNTRETUS VIGILAX* (Provancher), new combination

(Figs. 1, E; 2, G)

Gamosecus vigilax Provancher, Nat. Canad. 12: 167, 1880.

Microctonus vigilax Provancher, Additions et Corrections au Volume II de la Faune Entomologique du Canada traitant des Hyménoptères, 1888, p. 379.

Type.—In the Provincial Museum, Quebec, Canada.

Length 3 to 4 mm. Head in front view subquadrate, a little broader than long; eyes small; malar space at least half as long as eye in female, three-fourths as long as eye in male; face broad, finely rugulose or punctate; clypeus unusually broad, convex, wrinkled; mandibles very long; temples at least as broad as eyes, convex; frons with a fine median impressed line below median ocellus; antennae about as long as head and thorax combined, usually with 18 to 23 segments, the first flagellar segment much longer than any of the following, most of which are hardly longer than broad. Mesoscutum usually shallowly punctate anteriorly, polished posteriorly; propodeum deeply and broadly longitudinally excavated, the excavation forming a large pentagonal area, which extends from near extreme base of propodeum to its apex and is margined by carinae; mesopleurum without a furrow; stigma very broad; metacarpus lacking; radius arising from beyond middle of stigma; second abscissa of radius very weak. Abdomen in its widest part nearly as broad as thorax; first segment longer than posterior femur, very narrow at base, weakly wrinkled, smooth at apex; following tergites polished; ovipositor sheaths about as long as posterior femur. Yellow; metanotum, propodeum, and base of first tergite usually more or less piceous or black; antennae and legs yellow, wings hyaline.

The National collection contains a male and a female from Ottawa, Canada; a male without data; and five specimens from Colorado. The writer has also seen a male, in the collection of the Academy of Sciences of Philadelphia, from Niagara Falls, N. Y.

(3) *SYNTRETUS BREVICORNIS*, new species

Resembles *vigilax* but is at once distinguished by the well-developed metacarpus and radius, by the perfectly smooth and polished mesonotum, the weakly excavated propodeum, and the shorter antennae.

Female.—Length 2.2 mm. Head transverse, completely margined behind; face twice as broad as long between bases of antennae and base of clypeus; cheeks and temples convex, a little narrower than eyes; antennae not distinctly as long as head and thorax combined, 15-segmented; scape not much longer than thick and hardly longer than the pedicel; flagellum of uniform thickness throughout, the first segment the longest, longer than the scape; all flagellar segments longer than thick; ocellular line and postocellar line subequal, one and one-half times the diameter of an ocellus; malar space a little shorter than basal width of mandible.

Thorax at tegulae slightly narrower than head; mesoscutum entirely smooth and polished, with no indication of notauli; impression at base of scutellum broad and deep, not foveolate, propodeum strongly declivous behind, mostly smooth with a large median pentagonal area extending from near base to extreme apex, and a narrower lateral area on each side; propodeal spiracles a little before middle; mesopleurum completely polished; metapleurum smooth; legs slender; calcaria of

posterior tibia more than one-third as long as the metatarsus; stigma large, about twice as long as its greatest breadth; radius arising from beyond middle of stigma, the first abscissa nearly half as long as greatest width of stigma, forming a right angle with second abscissa, which is well developed and straight and extends almost to apex of wing; metacarpus distinct to apex of radial cell.

Abdomen as long as head and thorax combined, nearly as broad as thorax; first tergite broadening rather strongly beyond middle and with a little weak, indefinite sculpture before the spiracles, which are much behind the middle; remainder of abdomen smooth and polished; ovipositor sheaths scarcely as long as posterior metatarsus.

Head yellow; antennae dusky apically; thorax testaceous, dorsum piceous; legs entirely yellow; wings hyaline; stigma yellowish brown, the veins paler; abdomen yellowish brown, more or less piceous toward apex.

Male.—Very similar to female. Antennae as long as head and thorax combined, 14-segmented. Head and thorax yellowish ferruginous; stemmaticum and occiput piceous; abdomen mostly piceous beyond first segment.

Type locality.—(?) Urbana, Ill.

Type.—United States National Museum no. 49913.

One female and one male. The female type is labeled "5689", which apparently represents an accession number of the Illinois Natural History Survey. According to H. H. Ross, of that institution, this number refers to "beatings from box elder, Urbana, Illinois, May 23, 1885." The allotype was collected at Mount Holly Springs, Pa., by R. M. Fouts, June 16, 1920.

The Genus *EUPHORIELLA* Ashmead

Euphoriella Ashmead, U. S. Nat. Mus. Proc., 23: 116, 1900. (Genotype, *Labeo incertus* Ashmead.)

Closely related to *Euphorus*, the only essential difference being the absence of radius and the incomplete subcostella in *Euphoriella*. The two genera may need to be combined ultimately, but until additional material is obtained, showing more complete intergradation with *Euphorus*, it seems advisable to hold *Euphoriella* distinct on the basis of this character.

Head large, subquadrate, completely margined behind; temples and cheeks broad, not receding; face strongly receding; eyes converging anteriorly; antennae short, 14-segmented in all the specimens seen; scape twice as long as thick; pedicel longer than thick; vertex broad, convex. Thorax much narrower than head; notauli absent; impression at base of scutellum large, deep; propodeum narrowing a little posteriorly, not abruptly declivous and not excavated behind; stigma broad; medius absent or indistinct; median and submedian cells sparsely hairy; radius, intercubiti, recurrent vein, and subdiscoidaeus lacking; end of radius sometimes indicated by a very short spur at wing margin a little beyond stigma; basal vein, base of cubitus, nervulus, and submedius distinct; posterior wing narrow; subcostella incomplete, interrupted basad of basella; mediella and basella distinct; radiella, cubitella, submediella, and nervellus wanting; first abdominal segment slender, not or hardly broadened at apex, the spiracles at about the middle; remainder of abdomen more or less pyriform; combined first and second tergites large and overlapping beneath; ovipositor very short, hardly visible, somewhat decurved.

Euphoriella testaceipes Cameron (2, p. 261) appears to be the only species, in addition to the genotype, that has been referred to this genus, and it obviously does not belong here. The long antennae, impressed notauli, complete first cubital and first discoidal cells, and exerted ovipositor, which Cameron ascribed to *testaceipes*, disagree with the characters of *Euphoriella*. From the description alone the proper position for this species does not appear to be clearly indicated.

In addition to the genotypic species the National collection contains a single female which appears to be distinct and is described below. The two species may be distinguished as follows:

- Abdominal petiole delicately longitudinally sculptured, sometimes nearly smooth; posterior wing narrow; longest marginal cilia half as long as the width of wing; antennae, and legs including all coxae, mostly yellow; abdominal petiole usually brownish yellow.----- (1) *incerta* (Ashmead).
 Abdominal petiole covered with irregular, more or less confluent punctures, not longitudinally sculptured; posterior wing much broader, longest marginal cilia not half as long as width of wing; antennae and legs piceous; abdominal petiole black.----- (2) *pacifica*, new species.

(1) *EUPHORIAELLA INCERTA* (Ashmead)

(Fig. 1, D)

Labeo incertus Ashmead, Ent. Amer. 3: 74, 1887.

Euphoriella incertus Ashmead, U. S. Natl. Mus. Proc. 23: 116, 1900.

Type.—In the United States National Museum.

The foregoing generic description is supplemented as follows:

Length about 1.8 mm. Head smooth and shining; antennae of both sexes shorter than head and thorax combined, slightly thickened apically; basal three segments of flagellum elongate, slender; fourth and following segments gradually shorter and broader, some of them, at least in the female, not longer than broad; apical segment larger than that just preceding; mesoscutum and scutellum polished; propodeum rugose reticulate; mesopleurum smooth, with a few weak punctures below; metapleurum rugose reticulate; hind wing very narrow, the longest marginal cilia half as long as width of wing; first abdominal tergite nearly four times as long as its greatest width, not wider at apex than at base, weakly tuberculate at the spiracles, and longitudinally striate; remainder of abdomen polished. Piceous; antennae and legs mostly yellowish; wings hyaline; stigma pale brown with a transparent spot at base; abdomen usually yellowish with apical segments piceous.

The type, which is a male (not a female, as stated by Ashmead), is from Jacksonville, Fla. In addition, the National collection contains nine specimens, representing both sexes, from Florida, Maryland, the District of Columbia, Michigan, and Texas. The writer has also seen a specimen from Illinois in the collection of the Academy of Natural Sciences of Philadelphia. Nothing is known concerning the habits or hosts of this species.

(2) *EUPHORIAELLA PACIFICA*, new species

Distinguished from *incerta* (Ashmead) as indicated in the foregoing key.

Female.—Length about 2 mm. Head large, subquadrate, smooth and shining; temples and cheeks at least as broad as eyes; shortest distance between eyes about equal to the distance from antennae to apex of clypeus; malar space slightly shorter than basal width of mandible; malar furrow distinct; frons shallowly impressed on each side behind antennal foramina; postocellar line twice the diameter of an ocellus and slightly longer than the distance from one of the lateral ocelli to the median ocellus; antennae 14-segmented, not so long as head and thorax combined; scape about twice as long as thick; pedicel a little longer than thick; first and second flagellar segments of about equal length, twice as long as thick; the following gradually shorter and broader; seventh to eleventh flagellar segments as broad as long; apical segment longer, conical.

Thorax slightly deeper than broad, narrower than head; mesoscutum and scutellum polished; mesoscutum very sparsely hairy; the large transverse impression at base of scutellum divided into two shallow pits by a median carina; propodeum rugose reticulate, with a large apical area defined by a strongly arched carina; mesopleurum mostly smooth; metapleurum rugose reticulate; venation as in the generic description; hind wing not especially narrow, longest marginal cilia not

half width of wing; coxae polished; femora slightly thickened; calcaria of posterior tibia at least one-third as long as metatarsus.

Abdomen abruptly petiolate, pyriform; first segment slender, parallel-sided, and slightly arched, nearly four times as long as broad, ventral margins of tergite nearly meeting, the dorsal surface covered with irregular more or less confluent punctures; remainder of abdomen polished; fused second and third tergites broadening strongly behind, the posterior margin broader than thorax; the following tergites short; ovipositor sheaths barely visible; ovipositor very short and somewhat decurved.

Piceous black; scape, pedicel, and basal two flagellar segments slightly paler than remainder of antenna; wings hyaline; stigma brown with a small transparent spot at base; legs piceous; abdominal petiole blackish; remainder of abdomen piceous.

Type locality.—Mountain View, Calif.

Type.—United States National Museum no. 49914.

A single female specimen collected by E. M. Ehrhorn.

The Genus EUPHORIANA Gahan

Euphoriana Gahan, U. S. Natl. Mus. Proc. 46: 433, pl. 39, fig. 1, 1913. (Genotype, *Euphoriana uniformis* Gahan.)

This is very closely allied to *Euphorus*, particularly to forms like *Euphorus maculipennis* (Ashmead). It appears to differ only in the absence of the cubitus. Because of the otherwise striking similarity, and in view of the considerable variation in development of the veins in the middle part of the wing of *Euphorus*, it seems somewhat doubtful that *Euphoriana* can be maintained as a distinct group. In the absence of more completely intergrading forms, however, it has seemed best to retain the name for the present.

Head large, nearly quadrate; lateral ocelli far in front of posterior declivity of head; cheeks and temples margined behind; occiput immargined; antennae short, inserted below level of middle of eyes; thorax much narrower than head; pronotum rather prominent; propodeum narrowing posteriorly, gradually declivous, not excavated behind; anterior wing with only radius, basal vein, nervulus, and submedius distinct; stigma broad; radial cell very short; first abscissa of radius punctiform; second abscissa curved; combined median and submedian cells glabrous; mediellan and submediellan cells complete; abdomen petiolate, more or less pyriform; combined second and third tergites very long, not carinate laterally, overlapping beneath, ovipositor subexserted, decurved.

The genotype is the only known species.

EUPHORIANA UNIFORMIS Gahan

(Fig. 2, F)

Euphoriana uniformis Gahan, U. S. Natl. Mus. Proc. 46: 433, 1913.

Type.—In the United States National Museum.

Length about 1.8 to 2.5 mm. Head smooth; frons longer than face; malar space shorter than basal width of mandible; eyes long oval; ocelli very small; ocellocular line one and one-half times as long as postocellar line; antennae not longer than head and thorax combined, composed of 15 or 16 segments, basal flagellar segment as long as scape, the following gradually shorter, and slightly thicker in the female; mesoscutum narrowed anteriorly, smooth, sometimes finely transversely sculptured posteriorly; notauli very faint; propodeum rugulose; anterior tarsi stout, the second, third, and fourth segments very short, the fifth much enlarged; radial cell about one-third as long as stigma; first abdominal tergite narrow, broadening only slightly apically, about three times as long as broad at apex, longitudinally rugulose striate, the spiracles at about the middle. Yellow ferruginous; apical half of antenna, and sometimes apex of abdomen, blackish; wings hyaline, sometimes faintly discolored in first discoidal cell and beyond the middle; stigma broad, broadly hyaline at base; legs yellow.

The National collection contains specimens from Maryland, Kansas, New York, South Dakota, and Louisiana; and in addition

one specimen "collected in upper air over Mexico" by B. R. Coad, in 1928, in the course of airplane flights to ascertain certain facts concerning the distribution of the pink bollworm. The type was recorded as a parasite of *Meromyza americana* Fitch, while the New York specimens were reared from *Lygus pratensis* (L.). On the basis of the information available concerning host associations of related forms, the *Meromyza* record is probably incorrect.

The Genus EUPHORUS Nees

Leiophron Haliday, in part (not *Leiophron* Nees), Ent. Mag. 1: 263, 1833; Curtis, Brit. Ent., v. 10, no. 476, 1833.

Euphorus Nees, Hymenopterorum Ichneumonibus Affinium Monographiae . . . , v. 2, p. 360, 1834; Westwood, An Introduction to the Modern Classification of Insects, v. 2, Gen. Syn., p. 62, 1840; Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 9 (N. F. 9): 251, 1862; Reinhard, Berlin. Ent. Ztschr. 6: 327, 1862; Marshall, Ent. Soc. London Trans. 1887, p. 53; Thomson, Opuscula Entomologica, fasc. 16, p. 1745, 1892; Ashmead, U. S. Natl. Mus. Proc. 23: 116, 1900; Szepliget, Hymenoptera, Fam. Braconidae, in Wytsman, Genera Insectorum, fasc. 22, p. 175, 1904. (Genotype, *Euphorus pallidicornis* Nees.)

Peristenus Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 251, 1862; Ashmead, U. S. Natl. Mus. Proc. 23: 116, 1900. (Genotype, *Microctonus barbigger* Wesmael.)

Euphorus was described by Nees in the Serphoidea, which he called the "Proctotrupii." A year earlier Haliday and Curtis had described species belonging to this group but had incorrectly assigned them to *Leiophron* Nees. Westwood, in 1840, recognized *Euphorus* as a braconid and as being identical with *Leiophron* of Haliday and Curtis. In his classification of the Braconidae, published in 1862, Foerster used *Euphorus* as the basis of his family Euphoridae. At the same time he proposed *Peristenus* for species which he distinguished from *Euphorus* by the presence of distinct notauli; but subsequent authors, excepting Ashmead, have considered *Peristenus* a synonym of *Euphorus*. This seems the proper treatment, for certainly the two groups cannot be distinguished on the basis of the notauli alone, and there appears to be no satisfactory line of demarcation. *Euphorus* includes rather diverse forms, which, however, do not array themselves in groups sufficiently well marked to be considered distinct genera or even subgenera. The genus may be recognized by the following combination of characters:

Head usually thickened, frequently subquadrate, sometimes completely margined behind, sometimes margined only on the sides; temples and cheeks broad, convex; antennae rarely much longer than head and thorax combined; notauli ranging from entirely absent to strongly completely impressed; mesoscutum without a median rugulose area posteriorly; propodeum narrowing apically, convex, neither abruptly declivous nor conspicuously excavated medially behind; stigma large, very broad; radial cell never longer than stigma, usually much shorter; first abscissa of radius very short or lacking, the second curved; two cubital cells; medius indistinct or obliterated; first cubital and first discoidal cells separated, first abscissa of cubitus always present; remainder of cubitus, the intercubitus, and the recurrent vein varying from distinct and complete to entirely or almost entirely obliterated; nervellus usually distinct, rarely lacking; abdomen somewhat pyriform; first tergite more or less sculptured, usually broadening somewhat toward apex, but sometimes not broader at apex than at base; ovipositor at most subexserted, usually decurved.

Few definite host records are available for species of this genus. One oriental and one African species, however, are recorded as parasites of nymphs or adults of Hemiptera belonging to the family

Miridae; and a single North American specimen of *pallipes* was reared from *Lygus* sp., also one of the Miridae.

Key to the Nearctic Species of Euphorus

1. Wings somewhat banded or maculated; median and submedian cells glabrous; notauli entirely lacking.----- 2
Wings completely hyaline; median and submedian cells hairy; notauli usually impressed.----- 3
2. Head completely margined behind; recurrent vein distinct; first cubital and first discoidal cells closed ----- (1) *occipitalis*, new species.
Head with cheeks and temples margined, the occiput immargined; recurrent vein lacking; first cubital and first discoidal cells open behind ----- (2) *maculipennis* (Ashmead).
3. Head greatly enlarged, quadrate from above, triangular in profile; eyes more nearly horizontal than vertical; face ventral ----- 4
Head normal.----- 5
4. Scape not spinose.----- (3) *cephalicus* (Provancher).
Scape, especially in front, with numerous short spines ----- (4) *spiniscapus*, new species.
5. Recurrent vein and nervellus absent; spiracular tubercles of first tergite unusually prominent; notauli impressed only anteriorly; face not densely hairy ----- (5) *tuberculatus*, new species.
Recurrent vein and nervellus distinct; spiracular tubercles of first tergite not prominent; notauli complete; face densely hairy ----- 6
6. Head, thorax more or less, and base of abdomen, yellow; radial cell less than one-third as long as stigma ----- (6) *scitulus* Cresson.
Head black or blackish; thorax black; base of abdomen black; radial cell more nearly half as long as stigma ----- 7
7. Frons and mesoscutum polished; frons without a median carina; head behind margined only on sides; mesopleurum smooth ----- (7) *levifrons*, new species.
Frons and mesoscutum punctate, the latter more weakly so; occipital carina complete; mesopleurum rugulose punctate ----- (8) *pallipes* (Curtis).

(1) *EUPHORUS OCCIPITALIS*, new species

Most similar to *maculipennis*, from which it differs, however, in having the occipital carina complete, in the presence of a distinct recurrent vein, and in having the first cubital and first discoidal cells completely closed.

Female.—Length 2 mm. Head from above subquadrate, in profile subtriangular, the anterior angle being the point of insertion of the antennae; eyes large, prominent, converging anteriorly; face short and receding, smooth, not densely hairy; malar space a little shorter than basal width of mandible; cheeks a little narrower than eyes, broader than temples; vertex broad, convex; frons long, gradually declivous, smooth and polished; ocellocular line slightly longer than postocellar line, more than twice diameter of an ocellus; antennae 15-segmented, a little shorter than head and thorax combined, slightly thickened toward apex; scape about twice as long as thick; pedicel as long as thick; first flagellar segment about as long as scape, slender, the following gradually shorter and thicker, except apical segment, which is much longer than that just preceding.

Thorax slender, much narrower than head; mesonotum smooth and polished; notauli lacking; impression at base of scutellum broad and deep, divided by longitudinal carinae into four foveae; propodeum elongate, weakly declivous, rugulose reticulate; mesopleurum mostly smooth and shining; metapleurum finely rugulose and opaque; stigma broad, less than twice as long as broad; radial cell very short, less than one-fourth as long as stigma; first abscissa of radius punctiform or lacking; first cubital cell slightly longer than first discoidal, both completely closed; recurrent vein entering first cubital cell, removed by nearly its length from intercubitus; median and submedian cells glabrous; submedian cell complete; nervellus distinct.

Abdomen at third tergite as broad as thorax; first tergite broadening slightly behind, nearly three times as long as broad at apex, finely longitudinally rugulose striate, the spiracles only very slightly beyond middle; remainder of abdomen polished; ovipositor subexserted.

Yellow ferruginous; antennae dusky apically; legs concolorous with body, posterior tibiae and tarsi a little dusky; anterior wings hyaline basally; a pale brownish transverse band covering first discoidal and first brachial cells; first cubital cell, radial cell, and extreme base of second discoidal, hyaline; remainder of wing weakly brownish, almost hyaline at apex; stigma brown, hyaline across basal third; posterior wing entirely hyaline; abdomen more or less piceous.

Type locality.—Santa Cruz Mountains, Calif.

Type.—United States National Museum no. 49915.

Described from two female specimens. The paratype is labeled "Cañon of Colorado River, Dr. T. Mitchell Prudden, 1899", and was obtained by the National Museum with the Thomas L. Casey bequest in 1925.

(2) *EUPHORUS MACULIPENNIS* (Ashmead), new combination

Sierola maculipennis Ashmead, Ent. Amer. 3: 75, 1887; U. S. Natl. Mus. Bull. 45: 55, 1893.

Type.—In the United States National Museum.

Although he originally described this species in the Bethyilidae, Ashmead later recognized it as a braconid, stating in the second paper cited above that it belongs in the Euphorinae "and will probably form the type of a new genus." Still later he apparently concluded that it should go in the genus *Euphorus*, for the type is labeled, in his hand, "*Euphorus (Sierola) maculipennis*."

The species is closely related to *occipitalis*, described above, although readily distinguishable by the differences mentioned in the key. The type, a female, differs further from the description of *occipitalis* as follows:

Radial cell about one-fourth as long as stigma; intercubitus very weak, obliterated below; cubitus not distinct beyond the first abscissa; discoideus distinct only at extreme base; first cubital cell much longer than first discoidal; color mostly piceous.

The National collection also contains two male specimens; one, like the type, from Jacksonville, Fla., the other labeled "Cana, 2185, Collection C. F. Baker." There is some uncertainty, however, as to the locality record of the latter specimen, for Baker's notebook records no. 2185 as taken west of Fort Collins, Colo., June 20, 1896.

(3) *EUPHORUS CEPHALICUS* (Provancher)

Microctonus cephalicus Provancher, Additions et Corrections au Volume II de la Faune Entomologique du Canada traitant des Hyménoptères, 1886, p. 127.

Euphorus cephalicus Provancher, Additions et Corrections au Volume II de la Faune Entomologique du Canada traitant des Hyménoptères, 1888, p. 379.

Type.—In the Provincial Museum, Quebec, Canada.

Very closely resembles, even in the unusual form of the head, the new species described next below, but is immediately distinguishable by the unspined scape. Instead of being 0.25 inch long, as stated by Provancher, the type is about 2.5 mm in length.

The type, which is from Ottawa, Canada, is the only known specimen.

(4) *EUPHORUS SPINISCAPUS*, new species

(Fig. 2, D)

This species closely resembles *cephalicus* Provancher, differing especially, however, in its spinose scape.

Female.—Length 2.5 mm. Head very large, nearly quadrate as seen from above, more or less triangular in profile; face densely covered with appressed hair, strongly receding, nearly flat, much broader at lowest extremity of eyes than

at antennae; malar space as long as basal width of mandible; frons only slightly declivous, polished; postocellar line subequal to ocellocular line, more than twice the longest diameter of an ocellus; lateral ocelli situated considerably before posterior declivity of head; cheeks and temples very broad, fully as broad as eyes; eyes very prominent, more nearly horizontal than vertical; temples and cheeks margined; occiput immargined; antennae about as long as head and thorax combined, 18-segmented; scape twice as long as thick, covered with short spines; pedicel longer than thick; all flagellar segments longer than broad, the first three-fourths as long as scape.

Thorax considerably narrower than head; mesoscutum smooth and shining, with only a few weak punctures on anterior declivity; notauli shallowly impressed; impression at base of scutellum deep, foveolate, with the middle septum most prominent; scutellum small, polished, a little convex; propodeum closely rugulose, rather strongly declivous on posterior half; sides of pronotum smooth above and with the longitudinal impression transversely roughened; mesopleurum weakly rugulose with a broad oblique polished band from upper end of posterior margin to prepectus; legs slender; anterior femora and tibiae slightly thicker than those of posterior legs; anterior tarsi much shorter than their tibiae, the second, third, and fourth segments broader than long, the apical segment much enlarged; calcaria of posterior tibia about one-fourth as long as metatarsus; stigma large, much less than twice as long as broad; radial cell less than one-third as long as stigma; first abscissa of radius punctiform or lacking, the second abscissa rather strongly curved; recurrent vein entering second cubital cell very near intercubitus; median and submedian cells hairy; medius very faint; submediellian cell complete; nervellus much shorter than lower abscissa of basella.

Abdomen on third segment as wide as thorax; first tergite broadening gradually to apex, finely rugulose, the spiracles considerably beyond middle; remaining tergites polished, the fused second and third very large; ovipositor weakly exerted, straight.

Head mostly testaceous, the vertex more or less extensively piceous; antennae brownish, paler basally; thorax piceous to black, pronotum more or less ferruginous; legs brownish yellow; wings hyaline; stigma light brown, hyaline at extreme base; veins very pale; abdomen more or less piceous, the first tergite black.

Type locality.—Steamboat Springs, Colo.

Type.—United States National Museum no. 49916.

Two female specimens collected by C. F. Baker and bearing his numbers 1329 (type) and 1341 (paratype).

(5) EUPHORUS TUBERCULATUS, new species

Differs from other Nearctic species that lack complete notauli and have the face only weakly hairy in its hyaline wings, incomplete intercubitus, hairy median and submedian cells, and in the absence of nervellus.

Female.—Length about 2 mm. Head transverse, margined only on sides behind; face smooth, much broader than long; malar space at least as long as width of base of mandible; frons smooth, without a median carina; ocellocular line slightly longer than postocellar line, twice diameter of an ocellus; vertex and temples polished; cheeks nearly as broad as eyes; antennae of type broken, 14 segments remaining; scape about twice as long as thick; pedicel as long as thick.

Thorax a little narrower than head; notauli distinctly impressed only anteriorly; mesoscutum smooth; suture at base of scutellum broad and deep, with a median longitudinal carina dividing it into two large foveae; propodeum reticulate rugose; sides of pronotum smooth except for some delicate lineation below; mesopleurum smooth and shining, with a small rugulose area just above ventral margin; all femora slightly thickened; stigma very broad, nearly or quite two-thirds as broad as long, the outer side a little convex; radial cell less than half as long as stigma; first abscissa of radius wanting; intercubitus arising from stigma and obliterated well before attaining cubitus; cubitus distinct; recurrent vein absent; subdiscoideus only faintly indicated; median and submedian cells hairy; nervellus lacking or represented by a short spur; submediella very weak or obsolete.

Abdomen on third tergite about as wide as thorax; first tergite not distinctly broadening apically; spiracles at about the middle; the spiracular tubercles very

prominent; dorsal surface of first tergite rugulose, ventral margins nearly meeting at base; remainder of abdomen polished, the combined second and third tergites comprising most of dorsal surface; ovipositor subexserted, a little decurved.

Piceous; face, clypeus, mandibles, and cheeks ferruginous; scape and pedicel yellowish; pronotum ferruginous; legs including coxae brownish yellow; wings hyaline.

Male.—Essentially like the female but with the head entirely yellow ferruginous, also the mesonotum and mesopleurum ferruginous. Antennae 16-segmented.

Type locality.—Jacksonville, Fla.

Type.—United States National Museum no. 49917.

Described from 1 female and 2 males, all from the type locality.

(6) *EUPHORUS SCITULUS* Cresson

Euphorus scitulus Cresson, Canad. Ent. 4: 227, 1872.

Type.—In the Academy of Natural Sciences of Philadelphia.

This species resembles *pallipes* and *levifrons* in having the face thickly covered with somewhat appressed pubescence, in the presence of distinct notauli, and in venation. It differs principally as shown in the key to species, and in its smaller size, the type measuring only about 2 mm in length, and in the shorter antennae, which are not longer than the head and thorax combined and are 16-segmented in the type.

Known only from the unique type, which is from Illinois.

(7) *EUPHORUS LEVIFRONS*, new species

Closely resembles *pallipes* (Curtis), but is distinguishable by the characters mentioned in the key.

Female.—Length about 3 mm. Head transverse but with temples and cheeks about as broad as eyes; clypeus broad, polished; malar space a little shorter than basal width of mandible; face broader than the distance between antennal foramina and base of clypeus, very minutely punctate, subopaque, and thickly covered with appressed hairs; eyes large, elongate oval; ocellular line not distinctly as long as postocellar line; frons smooth, without a median carina and with only a few scattered very minute punctures laterally; vertex, occiput, and temples impunctate; temples and cheeks carinately margined behind, occiput immargined; antennae 23-segmented, longer than head and thorax; first flagellar segment fully as long as scape, the following gradually shorter.

Thorax hardly as broad as head; mesoscutum polished; notauli complete, sharply impressed, not distinctly foveolate; impression at base of scutellum large and deep, divided by a median longitudinal carina; scutellum convex, polished; propodeum rather evenly convex, rugulose reticulate except at extreme base laterally; side of pronotum sculptured in the depression, the broad upper and lower margins smooth; mesopleurum smooth, with only a few punctures below; first abscissa of radius distinct, not punctiform; radial cell not distinctly half as long as stigma; metacarpus not extending beyond radial cell; recurrent vein interstitial with first intercubitus; medius obliterated; combined median and submedian cells hairy.

Abdomen about as long as thorax and nearly as broad; first tergite broadening gradually from base to apex, rugulose punctate, the spiracles behind the middle; ventral margins of first tergite approximate at base; remainder of abdomen polished; second and third tergites combined embracing most of abdomen beyond first segment; ovipositor not, or barely, exserted.

Black, including face and clypeus; antennae dark brown, scape and pedicel brownish yellow; legs testaceous; posterior coxae and their tibiae and tarsi weakly infuscated; wings hyaline; stigma brown with a small pale spot at base.

Type locality.—Steamboat Springs, Colo.

Type.—United States National Museum no. 49918.

Described from two females bearing C. F. Baker's no. 1341, and recorded as having been taken by him in July.

(8) EUPHORUS PALLIPES (Curtis)

(Figs. 1, F; 2, L)

Leiothron pallipes Curtis, Brit. Ent., v. 10, no. 476, 1833.*Microctonus barbiger* Wesm., Monographie des Braconides Belgique, p. 69, 1835.*Euphorus pallipes* Westwood, An Introduction to the Modern Classification of Insects, v. 2, p. 62, 1840.*Peristenus barbiger* Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlande 19 (N. F. 9): 251, 1862.*Euphorus mellipes* Cresson, Canad. Ent. 4: 227, 1872. (New synonymy.)*Microctonus punctatus* Provancher, Nat. Canad. 14: 16, 1883. (New synonymy.)

Type.—The type of *pallipes* is apparently in the Melbourne Museum, that of *barbiger* is in the Academy of Sciences of Brussels, that of *mellipes* in the Academy of Sciences of Philadelphia, and that of *punctatus* in the Provincial Museum at Quebec.

The writer has studied the types of *barbiger*, *mellipes*, and *punctatus*, but has not seen that of *pallipes*. European workers are apparently correct in treating *barbiger* as a synonym of *pallipes*. The original descriptions seem to apply to the same species; and European specimens in the collection of the United States National Museum, determined as *pallipes* by Marshall and Schmiedeknecht, and as *barbiger* by Walker, are identical and agree exactly with the writer's notes on the types of *barbiger*. Furthermore, the types of the American *mellipes* and *punctatus* appear not only to be conspecific but to agree also with the type of the European *barbiger*. There seems to be no reasonable doubt, therefore, that all four names were applied to the same species; *pallipes*, being the oldest, is the valid name.

This species is very similar to *levifrons*, but apparently can be distinguished without difficulty by means of the characters given in the key. Except as follows the foregoing description of *levifrons* will apply to *pallipes*:

Malar space as long as basal width of mandible; frons punctate, with a median longitudinal carina below; occipital carina complete; antennae with 20 to 27 segments; middle lobe of mesoscutum more or less punctate; notauli distinctly foveolate; impression at base of scutellum with several longitudinal carinae; side of pronotum more completely rugulose; mesopleurum mostly rugulose; first abdominal tergite rugulose striate. Clypeus varying from yellowish ferruginous to black; face often somewhat tinged with rufous; abdomen beyond first tergite usually piceous.

The North American material examined, comprising about 125 specimens, indicates a range in distribution from eastern Canada to Alabama, and from New York State westward through the northern half of the United States to Oregon; a single specimen from Alaska is also included. Reliable host records appear to be lacking except perhaps in the case of a single specimen from Idaho, which is recorded as having been reared from *Lygus* sp. by W. E. Shull; another specimen, from Geneva, N. Y., is labeled "*Ex Polydrusus impressifrons?*," but this record is probably erroneous.

GENERA OF EUPHORINAE THAT HAVE NOT BEEN RECOGNIZED

LOXOCEPHALUS Foerster

Loxocephalus Foerster, Verhandl. Naturh. Ver. Preuss. Rheinlands 19 (N. F. 9): 252, 1862. (Genotype, *Loxocephalus longipes* Foerster.)

In the Foerster collection at the Zoological Museum, Berlin, the writer found a single specimen labeled "*Loxocephalus longipes*" in Foerster's hand. However, it is apparently not the specimen upon

which Foerster based his genus *Loxocephalus*, to which he ascribed impressed notauli and separated first cubital and first discoidal cells, for it has these cells confluent and the notauli not impressed. It is a male of *Myiocephalus boops* (Wesm.). The writer has seen no specimen that agrees entirely with Foerster's characterization of *Loxocephalus* and consequently is compelled to leave the genus unrecognized for the present.

ECCLITURA Kokoujew

Ecclitura Kokoujew, Rev. Russe Ent. 2: 5, 1902. (Genotype, *Ecclitura primoris* Kokoujew.)

This genus, based on a single female specimen from Transcaspia, appears to be most similar to *Perilitus* and *Eustalocerus*, agreeing with these in venation and in the exerted ovipositor, and seemingly further resembling the latter in having subgeniculate and somewhat clavate antennae with a long scape. The unusually long hypopygium, however, which the author ascribes to the genus, seems to be distinctive.

GENERA INCORRECTLY PLACED IN THE EUPHORINAE

HYSTEROBOLUS Viereck

Hystero bolus Viereck, U. S. Natl. Mus. Proc. 44: 559, 1913. (Genotype, *Hystero bolus mallochi* Viereck.)

This genus was originally placed in the Euphorinae by Viereck, but it belongs rather in the Blacinae, as evidenced by the long, narrow head, by the sessile first discoidal cell, by the long radial cell, which attains extreme apex of wing, by the relatively short submediellan cell, by the spiracles of the first abdominal segment being situated much before the middle, and by the carinately margined scutellum. It is apparently most closely allied to *Goniocormus* Foerster.

(EUPHORIDEA Ashmead) = CENTISTES Haliday (new synonymy)

Centistes Haliday, Ent. Mag. 2: 462, 1835. (Genotype, *Leiophron* (*Ancylus*) *cuspidatus* Haliday.)
Euphoridea Ashmead, U. S. Natl. Mus. Proc. 23: 116, 1900. (Genotype, *Euphoridea claripennis* Ashmead.)
Liosigalphus Ashmead, U. S. Natl. Mus. Proc. 23: 125, 1900. (Genotype, *Liosigalphus politus* Ashmead.) (New synonymy.)
Ancylocentrus Viereck (not Foerster), U. S. Natl. Mus. Proc. 46: 362, 1914.

Euphoridea was placed in the Euphorinae by Ashmead, but was later transferred to the Leiophroninae by Viereck, who synonymized it with *Ancylocentrus* Foerster. The latter genus, however, is a synonym of *Leiophron* Nees, the genotypes being synonymous. *Leiophron* appears to differ from *Centistes* only in the presence of distinct notauli, and it may be doubted that the two should be held distinct on this basis; but as long as they are maintained as separate genera *Euphoridea* is to be considered a synonym of *Centistes* rather than of *Leiophron*. *Liosigalphus* Ashmead is clearly congeneric with *Euphoridea* and is likewise to be treated as a synonym of *Centistes*.

HARKERIA Cameron

Harkeria Cameron, Ann. Mag. Nat. Hist. (7) 6: 537, 1900. (Genotype, *H. rufa* Cameron.)

The writer has not seen the genotype, and Lyle (10, p. 292) remarks that he was unable to find it. But despite the fact that Cameron specifically stated that the genus "belongs to the *Euphorides*", the

typical species appears to be an aphidiine and probably a species of *Aphidius*. The description, which is rather detailed, fits *Aphidius* exactly while it disagrees in important respects with the Euphorinae. The completely closed first brachial cell (second discoidal cell of Cameron's description) alone will exclude it from that subfamily.

COSMOPHORUS Ratzeburg

Cosmophorus Ratzeburg, Die Ichneumoniden der Forstinsecten . . ., v. 2, p. 72, 1848. (Genotype, *Cosmophorus klugii* Ratzeburg.)

In his original description Ratzeburg indicated that, apart from the shape of the radial cell, the confluence of the first discoidal cell with the first cubital, and the absence of the second intercubitus, *Cosmophorus* has nothing in common with the groups on which the present Euphorinae are based. Nevertheless, workers in the Braconidae, since the publication of Foerster's classification in 1862, have consistently referred the genus to that subfamily. The present writer does not agree with this treatment, however. In the impressed clypeus, the large opening between the clypeus and the mandibles, the small, nonprominent eyes, the 4-segmented maxillary palpus and 1-segmented labial palpus, the interstitial subdiscoideus, the subsessile or sessile first abdominal segment, the position of the spiracles of the first tergite, which are near the base, and finally the immargined prepectus, *Cosmophorus* disagrees with essential characters of the Euphorinae. It will not run to that group in any existing key to the subfamilies of the Braconidae, and it obviously does not belong there.

It is not clear that *Cosmophorus* belongs properly in any of the recognized subfamilies of Braconidae, but tentatively it seems best referred to the Pambolinae.

NEARCTIC SPECIES WRONGLY CLASSIFIED AS EUPHORINAE

Examination of the types makes necessary the transfer to other groups of Braconidae the following specific names which were originally assigned to euphorine genera. The types of the four species described by Provancher are in the Provincial Museum at Quebec, Canada, while that of the species described by Cresson is in the Academy of Sciences at Philadelphia.

SPATHIUS FASCIATUS (Provancher), new combination

Rhopalophorus fasciatus Provancher, Additions et Corrections au Volume II de la Faune Entomologique du Canada traitant des Hyménoptères, 1886, p. 129.

IDIASTA LONGICORNIS (Provancher), new combination

Rhopalophorus longicornis Provancher, 1886, p. 129.

ASPILOTA PETIOLATUS (Provancher), new combination

Rhopalophorus petiolatus Provancher, 1886, p. 128.

BRACHYSTROPHA LINEARIS (Provancher), new combination

Microctonus linearis Provancher, 1886, p. 127.

Dinocampus linearis Provancher, Additions et Corrections au Volume II de la Faune Entomologique du Canada traitant des Hyménoptères, 1888, p. 378.

SYRRHIZUS AGILIS (Cresson), new combination

Microctonus agilis Cresson, Canad. Ent. 4: 226, 1872.

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[Accepted generic names are in bold-faced type, accepted specific names in roman, synonyms in italics]

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